

# Gamebreaking Football Speed

## Complete Training for the 40 Yard Dash



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## **Introduction**

In football, the 40 yard dash is an important testing element for individual team assessments and combines as well as an opportunity to showcase pure speed. Training for this event in a structured way can drastically improve your overall speed, strength and level of conditioning. By reading, understanding and applying the concepts presented both in this manual and in your Groundbreaking Football Speed Program, you will increase your athletic capabilities, putting you a step ahead of the competition.

## **Workout, Practice and Game Preparation**

Ask an athlete to warm-up prior to a workout and they will begin to static stretch. It is engrained from elementary school gym class days that static stretching will prepare you for your activity. This is not only incorrect, but also counterproductive. Static stretching will inhibit your ability to produce your full elastic energy potential and muscular strength by elongating muscles, tendons, ligaments and fascia. We want to create force, while static stretching promotes muscle relaxation by reducing sensory activity and muscle spindle tension. We don't want our athletes calm and bored before our workouts so we don't have them static stretch prior. In fact, studies show that static stretching before engaging in intense workouts (practices and games) actually reduces power output.

Increasing range of motion is a goal of our warm-up, but also to prepare the athlete for the workout or game itself. The warm-up should consist of multi-planar movements at different speeds through full range of motion. Even though we are focusing on linear movements with regards to 40 yard training, we still want to make sure that the entire body is warmed up and ready for action. As the warm-up progresses, the intensity and speed will increase.

Following is a warm up that we use with our athletes to prepare for a speed session.

### Workout Preparation Warm up:

- 1) Jog 400m, skip 400m
- 2) Loose skipping w/arm swings 2x30y
- 3) Loose skipping w/arm circles 2x30y
- 4) Lateral Lunge walk x20
- 5) Spiderman x12
- 6) Forward Lunge w/Hamstring Stretch x20
- 7) Iron Cross and Scorpion x 20 each
- 8) Accelerations 2x30y @ 75% intensity
- 9) Backward Run 2x30y
- 10) 'A' Skip 3x15y
  
- 11) 'A' Run 2x20y
- 12) 'A' Run w/Sprint 2x30y
- 13) Accelerations 1x30y each at 85%, 95%, 100%

By performing this warm up, athletes will feel loose, warmed up and ready to go at full speed. They should be lightly sweating and should have an elevated heart rate. If this is not the case, athletes took too much time between exercises.

Remember, static stretching should not be a large part of your warm up. Instead, save it for after your workout, especially on tempo/recovery days, when your body is already warm. That is where you will make your biggest gains in flexibility. Warm up exercises should primarily be dynamic, as there is no relationship between static stretching and dynamic performance.

Here are examples of the warm-up exercises:

### Lateral Lunge



## Spiderman



## Forward Lunge w/ Hamstring Stretch



## Iron Cross



## Scorpion



## Backwards Run



## A Skip



Skip while focusing on stepping over opposite knee and driving down.

## A Run



Combining a 'butt-kick' and high knee in a cyclic running motion

## Hip Mobility

When you run, a great deal of your power is transferred and applied through your hips. Therefore it is important to gain strength and flexibility in those muscles so that they will allow you to stabilize your body and apply force to the greatest degree possible. We use hip mobility exercises as dynamic flexibility during the warm up to loosen up our hips, as well as strengthen those muscles. These exercises can be used before any workout, but we primarily use them on our general strength and aerobic conditioning days. For hip strengthening and loosening we use the following exercises: **fire hydrants, hip 'L' and up and backs**. Do each for 1 set of 20 with each leg during the warm up and do an additional 3 sets of 10 after your workout on general strength/recovery days.

## Fire Hydrants



On all fours. Raise one leg up to the side while keeping your leg bent and your ankle tucked. Raise that leg/knee to hip level and come back down and repeat.

## Hip 'L'



Raise the leg to 45 degrees. Perform a 'L'. The leg comes down and out. Don't let the leg touch the ground

## Up & Back



Bring the knee to the chest. Drive back, kick the sky with your heel. Toe dorsiflexed.

## Speed Training

The best way to get faster is to run fast. Therefore, speed training must be done correctly. Sprinting (as well as strength and power lifting) is taxing to the central nervous system (CNS). Once the CNS becomes fatigued, workouts quickly lose their effectiveness. Any type of speed work must be done with full recovery. Generally speaking, that means approximately one minute of rest for every 10 yards that you run. Sprinting is a highly technical activity. Without full recovery, both your muscles and your central nervous system will begin to fatigue quickly, reducing the short and long term effectiveness of your training. To optimize your success, full recovery must be adhered to both in your individual workouts as well as your weekly plan. It takes 36-48 hours to fully recover from a speed workout. Just as you would not lift weights on the same body parts two days in a row, you should not perform speed work two days in a row. Structure your training to ensure proper recovery or you dramatically increase the likelihood of injury.

The bottom line with speed training is that we are trying to move our body from Point A to Point B in the shortest amount of time possible. Strength and power training, flexibility, etc., are all necessary training elements that allow those speed increases and muscular adaptations to take place. However, learning proper running mechanics, from the start to acceleration to maximum velocity, will allow you to get the full benefit of all aspects of training, as well as shave those crucial tenths off your fastest time.

Getting into a good starting position is an overlooked, but crucial element of running a fast 40. Proper body position at the start will set you up to achieve faster acceleration and a higher top speed.

You must first determine your 'quick' leg and your 'power/strong' leg. An easy way to determine your "quick" side vs. your "power" side, fold your arms in front of you. The hand that is tucked under your bicep/armpit is your quick side arm. If your left hand is tucked under, your right leg is your "quick" leg.

Your quick leg is going to be in the back position when starting in a 3-point stance and your power leg will be in front. The

front leg is going to be the leg that is really starting the initial drive out so you want your strongest and most powerful leg in front.

Technically, the distance between the front foot (power leg) and the starting line should be approximately 55-60% of your leg length. The distance between feet should be shin length, which is about 42-45% of total leg length. A simpler and equally effective spacing is to start by placing front foot (power leg) two foot-lengths from the starting line and the rear foot (quick leg) another foot length between the front and rear feet. Spacing can be adjusted from there based on comfort, existing strength levels, etc.

## **Shoulder Position**

The position of the shoulders while in the starting is a subject for debate. Some coaches instruct their athletes to bring their shoulders out slightly past their hands, thus bringing the center of mass closer to the starting line. First off, at some football combines, this movement is illegal so check with an official at your combine if you prefer to use this technique.

We have found that leaning forward at the line often makes athletes fall forward at the start. So, their first step is catching and trying to control their body instead exploding out. They are actually trying to keep their feet underneath them to avoid falling forward and not creating horizontal velocity during the drive phase.

Your thumbs should be directly under your shoulders. This maximizes the distance of the shoulders from the ground. The shoulders should be directly over or slightly behind the hands. This will keep the hips from moving forward and upward on the set command. The quick side, (rear) knee should be in contact with the ground.

## **Hand Placement**

Hands should be placed about shoulder width apart to start. The hands should also be arched, so that only the fingertips are actually touching the ground. Doing this ensures that you will not place too much weight on your arms which forces your legs to move the majority of your body's mass. The thumb and index finger are going to take on the majority of the weight. They will also run parallel with the starting line.

Your quick side hand is going to be the hand that is going to be left on the ground supporting during the set position. Your power side hand will be raised off of the ground. Keep the power side arm at 90 degrees with that hand by your hip. Keeping your power side arm at 90 degrees at the starting position will enable you to come through with that arm quickly when driving out. The biggest reason to keep that arm at 90 degrees at the starting position is if your 40 yard time is being timed by a stop watch and not electronically. If someone is manually timing your 40 yard run with a stop watch, they are going on your first movement. If your power side arm is up to 120 degrees or so, it is easier to see that arm move first and it won't be as noticeable if it is kept at 90 degrees. So, it might be a slight time saver, but as you know, every little bit helps.

## **Head Alignment**

You have probably seen and heard many different ways to align your head while in the 3-point stance. Some coaches want you to keep your head down and looking back at your legs at the start. Other coaches believe that you should have your head up so that your eyes are looking forward. This may work on the football field since you need to see the ball snapped and know what's happening on the field, but we are looking to your body in the best 'exiting' position possible.

Your head position should be properly aligned with your spine (so it is straight). Looking down and back normally causes the athlete to break at the hips while driving out while trying to maintain that position. Also, another problem that I have seen with trying to keep the head down is that it can cause the athlete to lean too far forward while in the starting position and it causes a breaking of the hips in the drive phase.

### **Leg Angles (3 Point Stance)**

The front knee angle should be between 90 and 110 degrees, while the rear leg angle should be between 120 and 135 degrees. Existing strength levels will be the primary factor determining whether your knee angles are closer to 90 and 120 degrees, versus 110 and 135 degrees. This means that weaker athletes will have the hips higher in the air (closer to 120 and 135).

Evidence suggests that angles in this range allow for the greatest stretch reflex in the hamstrings, as well as the greatest amount of velocity when exiting the starting line. It is important that you know your limitations. Even advanced male athletes, at the high school level, usually do not have the strength and power capabilities to successfully use lower knee angles when in the set position. A tell tale sign of poor body and exit angles is seen when an athlete becomes completely upright within the first few steps of a race. Rapidly decreasing shin angles are the most obvious evidence of limited strength and power output.

### **Hip Height**

Hips should be above the shoulders. The degree of height above the shoulder will affect knee and hip angles, thus affecting force application and acceleration. The higher your hips the more weight you can shift to the hands.

Make sure that your hips aren't too high or you won't be able to support all the weight and your first step off of the starting line will be short almost 'catching' your body from falling. If

your hips are too low, you could have too much weight back where your body can't explode as ideally as you would like to overcome inertia. Also, you are most likely to 'pop' straight up on your first step, negating your acceleration phase.

## Starting Positions

There are several starting positions that you can use in your workouts:

1. **Standing Start** - Stand with your feet 2 and 3 foot lengths behind the start line respectively. Bend at the waist and let your arms hang loosely down toward the starting line. Drive forward at a 45 degree angle using both legs equally. Do not let your weight shift back so that you initially drive off of your back leg. Doing so will cause you to lose time and power.
2. **Three Point Stance** - Begin the same as with the Standing Start. Now put the opposite hand from the front foot on the ground. Reach back with the hand on the front foot side. Weight is on the finger tips, but not too far forward. Your shoulder should be in line with your hand and your hips should be higher than your head.
3. **Four Point Stance** - Same as Three Point Stance, except both hands are on the ground. Make sure your shoulders are directly above or slightly behind your hands.

## The Start

One common tendency at the start is for athletes to try to focus on too many starting elements at once. This 'paralysis by analysis' often leads to a slow reaction time and poor acceleration. In general, an athlete can only focus on one motor cue at a time. Once you are set in your three-point stance, there are several things you can do. Your options depend on how the 40y test is set up.

## **Starting Cues**

Most football combines time their 40 yard runs electronically or FAT (fully automated timing). One of the easiest ways for them to time is to have the electronic timing device connected to a gun, when the gun fires, the timing starts. So, here is a tip if you are getting your 40 timed by your reaction to the gun.

There are two things you can focus on. One is to focus on a motor set, which means to focus on your first movement, not the gun. Second, would be a sensory set. This means that you would focus your attention on the starter's gun. Focusing on the gun isn't necessary because you are going to hear it and react to it whether you are focusing on it or not. By focusing on a sensory set as opposed to a motor set, you are likely to get a slower reaction time to the gun. By waiting to react to the gun, you have to wait to hear the gun, and then your brain has to acknowledge the sound of the gun, and then send a signal to your muscles to react to the gun. This might only take .10, but it is time you cannot afford to waste.

Instead, focus on driving the power side arm (if your right leg is forward, then drive your right arm) up as soon as the gun goes off. This will help bring your quick side leg through as well as help you drive through your power side leg.

## **Movement starts**

Some 40 tests are timed from the athlete's first movement, i.e., when the hand leaves the ground or leaves a timing pad that starts the clock. This method eliminates the factor of reaction time, allowing the athlete to accelerate when they are ready. In this situation a motor set is still ideal. Once set, the first action is to drive the power side arm up. Again, this helps to bring the quick side leg through, drive off the power side leg and set up a fluid acceleration to top speed.

## **Acceleration**

For our purposes, acceleration consists of all elements of sprinting from the moment your hand leaves the ground until you reach top speed. Top speed is generally achieved between 15-30 meters.

Acceleration, though a highly technical activity, can be summed up with a simple statement: run as hard as you can, while using the least amount of effort. If you try too hard to run fast, your form will break down and will not reach your top speed. Watch any top sprinter run a race and you will notice how effortlessly they appear to be running. The fastest people on the planet know that running relaxed is always faster than straining and fighting your way to the finish.

## **Acceleration Mechanics**

Speed is a product of stride length (the distance your hips travel in a stride) and stride frequency (the number of steps you take in a given time period). However, you will not reach top speed by focusing on increasingly larger steps to increase stride length or taking short, quick steps to increase stride frequency. Instead, top speeds are created by applying more force to the ground. Newton's Third Law tells us that every action has an equal and opposite reaction. Therefore, the more force you apply to the ground with each stride, the more energy the ground will return, thus helping to create a greater top speed. The glutes(butt) and hamstrings are the primary 'sprinting' muscles. Using these muscles during acceleration to fire the feet into the ground underneath the hips will create the greatest ground forces possible and therefore the greatest increase in speed.

Ground contact times (the amount of time each foot spends on the ground) are another important factor to consider during acceleration. During the earliest parts of acceleration, especially the first two steps, you are trying to overcome the

weight of your body by moving it forward as quickly as possible. This takes a great deal of strength and power. Therefore, your contact times should start off being relatively long and get progressively shorter as your speed increases. The opposite is true with stride length. Your strides should start off relatively short and get progressively longer until you are up to full speed and your contact times decrease. Heel recovery should be low during the first 6-8 steps of acceleration until the body is in an upright position.

Optimal stride length should be about 2.5-2.7 times your leg length (measured from the crest of your greater trochanter to the floor).

While optimal stride length is important, I would stay away from certain exercises to try to increase it. Excessive downhill and over speed running can actually cause problems with your running technique. If the slope going downhill is too much and if you are being pulled fast during over speed work, your legs starts to create a braking action. This is where your foot plantar flexes (toes pointed down) in front of your center of mass to try and stop that speed. So, you are fighting yourself and stopping any speed you are trying to create. This can not only cause damage to your hamstrings but can also create neuromuscular integration problems.

## **Drive Phase**

The drive phase happens right after you react to the starting gun. Your initial 8 -10 steps is considered your drive phase. The biggest problem seen with athletes in the drive phase is that they know that staying low will create better exit angles set-up the ideal acceleration phase. The problem is that athletes are 'trying' to stay low.

When athletes try and stay low they normally hold themselves down by breaking at the hips. This will limit the amount of force you can apply to the ground and leads to poor acceleration. Let your upper body unfold naturally. You want to keep a straight line from your back ankle all the way to your head. 'Staying low' will occur naturally if you are already strong enough.

Other cues:

- Drive out so the body is at a 45 degree angle to the ground.
- Keep the heel recovery low during the first 6-8 strides.
- Step over the opposite knee and drive the foot down into the ground to create maximal force.

## **Acceleration**

Since the acceleration phase (0-30 yards) is associated with a higher stride frequency than at maximum speed, athletes are concerning themselves too much trying to be quick with their legs. So, instead of trying to drive out and be powerful, athletes are 'spinning their wheels'.

Make sure when you are running the 40 that you are getting triple extension (ankle, knee, hip) and that you 'feel your feet behind you'. If you are getting the sensation of your feet driving well behind your center of mass, then you know you are finishing off your leg drive to be as powerful as possible. If you try to be too quick with your legs, you will not be using your full strength to drive out and although you might feel a little faster because your legs are moving quicker, you will actually have a slower time and not set yourself up to be in the best possible position.

## **Relax!**

One of the hardest things about running is trying to stay relaxed while you run. Most athletes first think that in order to run fast that they have to run hard. They associate running hard with trying to create as much tension as possible. You can tell easily if an athlete is too tense, just by looking at their facial expression.

If you see an athlete with a tight face, their eyes will be squinting, teeth are mashed, and you know that they are trying too hard and are forcing themselves to be slow down. If you see an athlete with their cheeks flopping up and down as they run, you know that they have mastered the relaxation technique and are getting the most out their sprinting.

I remember sprint coach guru Charlie Francis saying that you must 'let the speed come'. You have to let your muscles work for you and not against to maximize your speed potential. This is a tough concept to learn and MUST be practiced if you want get the most out of our speed.

Other things to look for if you are running tight are clenched fists, elevated shoulders and a shortened stride.

### **Arm Action**

Arms should remain at approximately 90 degrees from the elbow. The angle will close at the top and open at the back (60-140 degrees) but the average is about 90 degrees. Make sure that you are not locking your arms 90 degrees, this will cause tightness and decrease your range of motion.

- Palms and fingers are relaxed and facing in
- Drive the elbows down and back to generate elastic response
- Range of motion - hip to ear

Also, make sure that the arms are not crossing the midline of your body. The arms are counteracting the force created by the legs. So, if you arms are going side to side you know that your hips will be turning because your legs are driving side to side. You want to be traveling in a linear direction with as little deviation as possible.

### **Open vs. Closed Hands**

Cueing the hands can be a touchy subject. Some coaches believe

that having your hands open is the best way while others like a closed hand for their athletes to use while running.

First, I would look at the athlete. If they look as if their shoulders/arms are staying relaxed and aren't crossing the midline then you shouldn't cue this athlete too much with hand technique. There are so many other cues and techniques to work on then to worry about their hands if they don't seem to be causing a problem.

If your athlete is not staying relaxed in their arms and shoulders then I would address their hands. Usually if the hands are wide open with the fingers and palms are straight, the forearm tends to be flexed. This causes tension of the arm and the upper arm and shoulders, and as you know, this can affect the elasticity of your muscles causing you to fight yourself as you move. The same thing can happen when you make a fist and try to run. Holding your hands clenched causes your forearms to be tight and you will run into the same problem as the 'open' hand.

I teach in between both of these. You want your hands to stay relaxed. I'm sure you have heard this saying before to 'pretend you are holding a potato chip in your hand and you don't want to break it'. You can actually feel your fingers almost bouncing up and down as you run. This is the type of relaxation that should carry to the rest of your arm up to your shoulder. Keep the hands loose, but not open.

Another thing to note is that looking at the top receivers and defensive backs, they never run with closed hands because they want their hands to be as soft as possible to catch a ball. If their hands are closed, their arms will be tight and it will take more time to open them and create the soft hands that they are looking for.

### **Acceleration Cue Review**

- Drive the lead arm (same as front leg) up as you begin to sprint.
- Drive out so the body is at a 45 degree angle to the ground.
- Keep the heel recovery low during the first 6-8 strides. Think about 'running on hot coals' to get an idea of how your heels should be recovering.

- Drive the elbows down and back. Keep the hands loose, but not open. Arms should remain at approximately 90 degrees from the elbow.
- Step over the opposite knee and drive the foot down into the ground to create maximal force. During acceleration, the foot should strike directly below or slightly behind the hips.
- Don't force yourself to 'stay low'. This will limit the amount of force you can apply to the ground and leads to poor acceleration. Let your upper body unfold naturally. 'Staying low' will occur naturally if you are already strong enough.
- Hips tall
- Foot strikes on forefoot- and under the center of mass
- Ankle steps over the knee
- Shoulders down and relaxed
- Face and neck relaxed
- Tight stomach, flat back, hips forward
- The foot hits the ground a short distance in front of the center of mass, the farther away the foot strikes away from the COM, the higher the braking force.
- toe up - reduces hamstring fatigue by using the gastroc as a knee flexor
- Heel up
- Knee up

#### Sample workouts:

1. 8 - 10 x 30 yards uphill w/ 3-4 minutes rest between each run
2. 8 x 10 yards from 4 point stance (1' rest), 6 x 20 yards from 3 pt stance (2' rest), 3-4 x 40 yards, alternating stances (4-5' rest)
3. 10 x 30 yards from various positions (pushup, seated, seated backwards, lying down, roll over, lunge position, etc.)
4. 10, 10, 20, 20, 30, 30, 30, 40, 40, 30, 30, 30, 20, 20, 10, 10  
- walk the distance you just ran and then go into the next interval.
- **Note:** This workout is a speed endurance workout and will cause neuromuscular fatigue.
5. 3-4 x 10, 20, 30, 40 - rest 2' between each run and 5-7 minutes between sets

**>Note:** When resting between runs or sets, always keep moving. Do not stand around and let your muscles tighten up.

## **Maximum Velocity**

Maximum Velocity is another way of saying running at full speed. The point in a workout or time trial that you reach maximum velocity depends on existing strength levels, experience and running mechanics. However, regardless of where and when you reach full speed, there are some differences in running mechanics and effort when compared to acceleration.

When running at full speed, you no longer need to try and apply the same level of force to the track as during acceleration. This is a common mistake in young athletes. Now that you are at full speed, you will be completely upright (perpendicular to the ground) and your body will no longer be leaning at an angle as you were during acceleration. By continuing to try to run faster and faster throughout a run, as though you were still accelerating, you are actually going to have a breakdown in running mechanics. You can only maintain top speed for 1-2 seconds before you start to slow down. By continuing to try to accelerate while beginning to fatigue, you will only slow yourself down faster because you can not continue to coordinate your movements with accuracy.

Instead, you want to relax or 'float' during maximum velocity. What this means is that you want to ease back in the amount of effort you are expending while running, but without slowing down and losing any speed. This idea sounds contradictory and like any new skill, it takes some practice to perfect. While running, you want to continue to step over the opposite knee, but instead of driving the ball of the foot down into the ground, you are just going to tap the foot downward, letting the ground come to you. Continue to drive the elbows down and back at the same speed, but without the same intensity as during the early part of your run. Remember, you are not going to get any faster at this point so energy conservation is important. We know that your brain tells you to keep running harder so that you do not slow down, but you have to fight the urge to do that and run smart. It is the ability to make these types of adjustments that

can be the difference in running a fast time, outrunning an opponent or chasing one down to make the play.

### **Maximum Velocity Tips and Cues**

- Continue to step over the opposite knee, but let the ground come to you.
- FLOAT - Ease back in intensity, but don't slow down. Other cues for floating:
  - Maximum Speed, Minimum Effort
  - Try Easier or Run Easier (Instead of saying 'Try Harder' or 'Run Harder')
  - Carry Your Speed
- Fight the urge to continue to run faster and harder. One of the goals of top speed training is to learn how to decelerate the slowest. The athlete who decelerates the slowest runs the fastest. Relaxation is the only way to decrease the speed at which you slow down.

#### Sample workouts:

##### 1. Fly 20s, 30s and 40s:

Place a cone at the starting line, at 15y, at 35y and at 55y. Accelerate hard to the first cone (15y). Maintain the speed you have generated by running relaxed and following the maximum velocity cues from 15 - 35y. Once you hit 35y, slowly decelerate for the next 20y coming to a full stop at the last cone. This is a fly 20. Once you are comfortable holding that speed for 20y, you can move the second cone to 45y (fly 30s) and 55y (fly 40s).

Total volume for these workouts should be between 250 - 350 yards.

##### 2. Sprint-Float-Sprint

Place a cone at the starting line, at 15y, 25y, 35y, 45y and at 60y. Accelerate hard to the first cone (15y). Sprint hard from 15 to 25y. From 25y - 35y, float. Carry the speed you've generated over the previous 25y. Think of cruise control in a car. The car isn't slowing down, it's maintaining the speed it is at. Don't slow down. It is easy to spot an athlete that has slowed down during the float portion of this drill.

First, their feet no longer drive down underneath them. Instead the foot will come out past the opposite knee and strike the ground out in front of the athlete, causing a braking effect. It is similar to how an athlete will look once they finish the exercise and decelerate to a stop. With the foot landing out in front, the athlete slows down and comes to a full stop. Certainly, this is not what we want when performing a drill designed to increase top speeds and the maintenance of near top speeds.

Second, the athlete's shoulders will come back behind the hips. It looks slightly like the athlete is pulling up do to an injury. Instead of having a very slight forward lean where the shoulders are slightly leading or directly in line with the hips, the athlete instead has their shoulders slightly behind the hips. This is due to the feet landing out in front of the Center of Mass and changing their mechanics. Again, when athletes do this during this drill, it is clear that they do not yet understand, experientially, the concept of Floating. This will take time, but once an athlete 'gets it', it will quickly become more natural.

In actuality, athletes should be faster during the 'float' portion of this drill than during the 'sprint' portion. This is why we emphasize relaxation during running. It is simply more efficient and effective than fighting yourself.

Overview of the 40:

Foot position:



Count out 2 steps with your feet and place your front foot there. Now count out 1 step from that placement and that is where your back foot should go.



Set position. Hips are higher than the shoulders, back arm is slightly bent, shoulders are over the hand. First movement is driving the lead arm. You are looking for low heel recovery while stepping over the opposite knee.



Athlete reaches triple extension (ankle, knee, hip) with the driving leg and has created that 45 degree exit angle. Foot touchdown is right underneath the hips so he can apply optimal force.



Second step the athlete is finishing off the 'drive' as you can see that he reaches triple extension again.

## **Work Capacity Development**

The reason this aspect of training is important, besides the fact that most speed and conditioning programs ignore it, is that to be the best athlete you can be, you must be a complete athlete. In order to improve your overall work capacity (the amount of work you can do and still be productive), you must improve your fitness level and general strength. When your work capacity is increased, you will be more efficient in your movement, have better coordination and increase muscle strength and endurance. In addition, your muscles will warm up faster, stay warm longer and you will increase your overall aerobic capacity. Above all else, work capacity workouts will help your body heal and recover from heavy CNS stressing workouts (such as speed/power days). By implementing these General Strength and Tempo Conditioning workouts into your athletes' training programs you can expect to see serious improvement in their productivity from the opening kick off until the final seconds tick off the game clock.

### **General Strength**

General Strength work normally consists of non-weight bearing (body-weight) exercises. This type of work, best done in the form of circuit training, improves soft tissue strength, increases aerobic capacity and improves upon all the elements discussed in the previous paragraph outlining work capacity development. It is an ideal type of general strength training for athletes looking to improve speed and power because of the overall increases in total body conditioning, aerobic development, as well as providing necessary recovery elements.

### **General Strength Circuit 1**

Perform each exercise for 30 seconds, moving right to the next exercise without resting. After completing the circuit, rest for 3 minutes, then perform the sequence a second time. As a variation, perform a prescribed number of repetitions for each exercise then jog (at 50-60% intensity) 40 yards between each exercise.

Burpees aka Squat Thrusts x 15  
Walking Lunges x 20  
Rocket Jumps x 15  
Pushups with clap x 12  
Hi-Mountain Climbers x 30  
Split Squat x 20

### **General Strength Circuit 2**

In between each exercise, jog 50 meters. Rest 4 minutes and perform the circuit again.

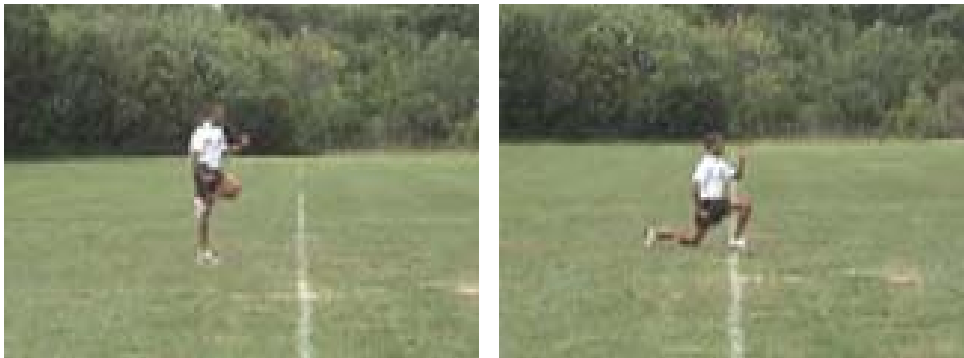
Prisoner Squats x 20  
V-Sits x 15  
Lateral Lunges x 20 meters  
Rotational Pushups x 8 each side  
Side L-Raise x 10 each side  
Single Leg SLDL x 10 each leg  
Half Burpees x 10

Pictures of the above exercises:

### **Burpees**



### **Walking Lunges**



### Rocket Jumps



### Pushups with clap



### Hi-Mountain Climbers



### Split Squat



### Prisoner Squats



### V-Sits



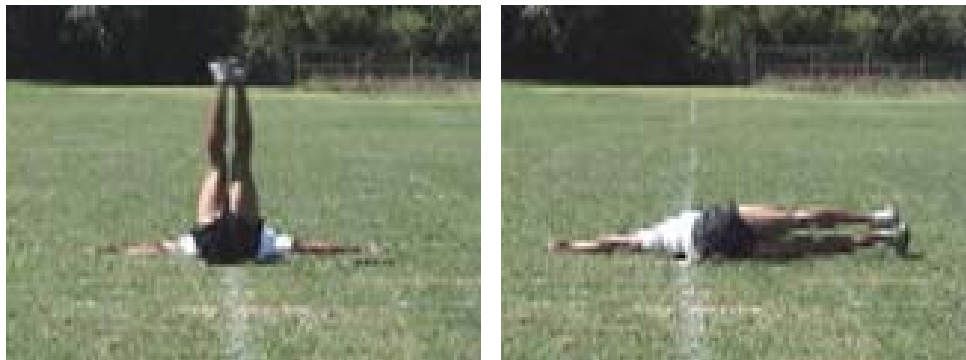
### Lateral Lunges



### Rotational Pushups



### Side L-Raise



### Single Leg SLDL



### Half Burpees



These workouts should be done the day after your speed/power day. They will aid in recovery from the previous day as well as help get you in the shape you need to be in to stay strong deep into the fourth quarter.

## **Tempo**

There is a better way to improve your aerobic fitness than going out on the roads to do counterproductive mileage. Tempo running is used to improve aerobic power and anaerobic capacity. A Tempo run is performed by running at approximately 70% capacity for a set distance (usually about 100 yards per interval). The run should take place on grass (as long as you have a flat surface) and we recommend running between 1000 and 2000 yards total. So, without hitting the roads, you can improve your fitness level in an easier, faster and more efficient way. Also, while increasing your aerobic capacity, you are aiding your body in recovery by helping the body flush out the metabolic waste that you created the previous day while doing intense speed work and plyometric training.

By increasing the intensity of the workout to 80%+ for each rep, you can develop anaerobic capacity. This type of workout will induce lactic acid buildup and teach athletes to maintain form and focus when their bodies are in a state of oxygen debt. Both workouts are effective conditioning tools to be used in your training arsenal.

When training at 80% or faster, be sure to increase the rest. Athletes should be able to hit the necessary times for each interval for this workout to be most effective. Remember, anyone can create a workout that cannot be completed. This will not get your athletes in shape, it will only cause them to fatigue faster, wear their bodies down and increase the likelihood of injury. Again, train smarter not harder.

### **Example 1**

On the football field, starting at the endzone on the sideline.  
Run endzone to endzone at 70% (100 yards)  
Walk from the sideline that you are on to the far sideline.  
Repeat 10 times (1000 yards total)

**Example 2** (on the track)

Run 100m at 70% and rest for 45-90 seconds and repeat 6 times.  
Rest for 3 minutes.

Run 100m at 70% and rest 45-90 seconds and repeat 6 more times.  
Total of 1200 meters.

**Example 3** (on the track)

Run 75 meters (at 70%), walk 25 meters. Perform 8 times then  
rest for 3-4 minutes and perform 8 more times. Total of 1300  
meters.

Remember that in running, the main function of the arms is to assist the abdominals and obliques in controlling the torque created by the legs during each stride. The stronger the legs, the more the potential for torque. Therefore the mid-torso and arms/shoulders must be worked hard in conjunction with the legs. The abs and lower back muscles are stabilizing muscles and should be worked out as such, so isometric workouts are better than repetitive. The bottom line with ab/core training is that it can not be overlooked if you desire to generate the greatest results. Core work must become a part of your training routine. There are no great speed/power athletes with weak midsections.

Work your mid section at least three days per week. There are an almost endless number of abdominal exercises that you can do. Mix it up so that your workouts do not become stale and repetitive.

## **Strength Development**

Running the 40 yard dash is all about force production/application. Faster top running speeds are achieved with greater ground forces. You need to get stronger in order to be able to apply more force. The more force you can produce and the more efficient you are at producing that force, the faster you will be.

Weight training is supplemental to speed work, meaning it is a means to an end, not an end in and of itself. You need to increase strength levels, but also focus on power development. Strength and power are not the same thing. For this reason, we are only going to focus on the three exercises best related to sprinting and power. We are not going to prescribe a lifting routine to help build mass because it is not the way to increase speed. General strength circuits will help correct muscle imbalances.

Weight training should be done on speed days that place a high demand on the CNS. Since our weight training is also stressing to the CNS, it should not be done on a recovery day in order to give the CNS as much relief and recovery as possible.

Improve neuromuscular recruitment patterns, rate coding, temporal patterning and synchronization.

### **Cleans**

Cleans are an Olympic Lift that develops absolute strength, power, coordination and muscle stabilization. Cleans and other Olympic Lifts are an excellent, arguably critical, addition to any strength training program. However, when performing this lift it is imperative that athletes use correct technique. In fact, if technique isn't perfect, athletes should refrain from using this lift entirely.

Many coaches and athletes use the clean, but in my experience the vast majority of athletes do them incorrectly and the same percentage of coaches do not know how to or feel comfortable teaching proper clean technique.

If you fall into this category, visit [www.completeolympiclifting.com](http://www.completeolympiclifting.com) and take a look at the only Olympic Lifting instructional DVD with the highest number of exercises and progressions designed specifically for athletes. If you or your athletes have a technical issue performing the Olympic Lifts than Complete Olympic Lifting contains the exercise, drill or cue that will fix it, guaranteed.

An athlete who does not execute plays correctly is a liability on the field. An athlete who does not execute highly technical lifts correctly is a liability in the weight room and increases the likelihood of injury.

## Squats and Deadlifts

These legs lifts are also staples of a good weight training program. Like anything else, learn how to use proper form before attempting to do these lifts.

In order to generate maximal force in the shortest time possible (but without creating fatigue) we want to complete our lifts in the alactic anaerobic metabolism, which lasts about 10 seconds. Therefore, do 2-5 sets of 2-6 repetitions. Rest between sets should be 3-4 minutes to ensure that the alactic anaerobic system is fully recovered (ATP stores are fully replenished).

### Clean



### Deadlift



## Squat



Example of a 4 week cycle:

### Week1

Day 1 (Monday)

Cleans 4x5

Deadlift 4x4

Supplemental lift(SL) 3x8

Day 2 (Wednesday)

Cleans 3x5

Squat 4x6

SL 3x10

Day 3 (Friday)

Cleans 4x5

Deadlift 4x3

SL 3x8

### Week 2

Day 1 (Monday)

Cleans 5x2

Squats 4x4

SL 3x12

Repeat weeks 1 and 2

Day 2 (Wednesday)

Cleans 3x6

Deadlifts 4x5

SL 3x8

Day 3 (Friday)

Cleans 4x3

Squats 5x3

SL 3x10

## Supplemental Lifts

The arms, shoulders and back must be worked hard in conjunction with the legs. However, we are athletes not body builders. Carrying around excess bulk muscle that does not directly contribute to your performance only stands to slow you down and tire you out. Work these muscles in moderation. At the very least, save the bicep curls and extra chest exercises until after the leg lifts are done. The strength in your legs and midsection will make you a great athlete.

## **Plyometrics**

Plyometric training is an important aspect of power training. These exercises primarily use body weight as resistance and, when done correctly, can greatly increase power levels and overall speed. Plyometrics are a somewhat controversial topic. Due to the intensity (they place a high demand on the central nervous system) and the need for correct form, they can cause injuries when not performed correctly. Plyometric exercises should be learned progressively, starting with two foot jumping and landing exercises (box jumps), then moving to stabilization work (single leg box jump), then finally moving to more complicated multi-jumps(double and single leg hurdle hops). For our purposes in this manual, we will only be discussing the more basic, two foot exercises.

Due to the high CNS demand, plyometric exercises should be performed on your speed and weight training days. These movements are a supplement to your speed training and should be performed after your sprint work and before your work in the weight room. When doing any plyometric exercise, always focus on driving through the hips. As we have mentioned previously, the hips are your power base. In order to consistently create the power needed to benefit from plyometric training, you must focus on getting full extension in through the hips. Another critical factor in this type of training is to concentrate on landing softly. Absorb each landing with the muscles in your legs instead of the bones, joints and tendons. Your feet should not make a loud noise upon making contact with the landing surface, whether it is a box or the ground. This way you will drastically reduce the likelihood of an acute injury or one that develops over time.

### **Exercises:**

#### **Box jumps:**

This is a beginner exercise that athletes at all levels should start with. Boxes can start at 12" and move all the way up to 48". The goal of box jump is to create power by jumping from two feet, getting full extension of the ankles, knees and hips. Since you are landing on an elevated platform, the full impact of landing is reduced. This allows the athlete to concentrate on

jumping with good form. Once the takeoff is improved, the athlete can then move onto bounds that will focus on landing technique as well.

Progression: Single leg box jumps. With this exercise, start with a low box (12") and concentrate on landing softly. Do not step down from the box until you have stabilized your body.

**Note:** When landing on the box, if the position of the hips upon touchdown is lower than the original starting position, the box is too high. Lower the height of the box so that you can land in the same position you started in.



### Hurdle (or cone) hops:

This drill is a progression from the box jumps. Now you must focus on a proper landing, as well as an explosive take off. This drill can be done in two ways. The first is to jump over the hurdle and then focus on a soft landing. Once you have achieved a soft landing and have regained your balance, jump over the next hurdle. A more advanced version is to make the hurdle hops continuous. Performing the exercise in this way should only be done once the stabilized landing has been perfected. In order to maintain power output, focus on driving through the heels and getting full extension through the ankles, knees and hips. If you do not get this triple extension, you will not maximize your force production.

Progression: Do the hurdle hops off of one leg. Be sure to use small hurdles or even cones as this is a highly advanced exercise.

## Forward



## Lateral



### Example workout:

Perform these plyometric exercises on your speed and lifting day. We will assume that you will perform two speed days per week.

#### Day 1

##### **Box jumps:**

(2 feet)

2 x 5 on 24" box

rest 3 minutes between sets

3 x 5 on a 36" box

rest 3 minutes between sets

##### **Hurdle hops:**

(2 feet)

2 x 6 hurdles 27"

rest 1 minute between sets

(1 foot)

2 x 6 hurdles (each leg) at 12" - stabilize the landing

2 x 6 hurdles (each leg) at 12" - continuous

## Day 2

### **Box jumps:**

(2 feet)

2 x 5 on 36" box

rest 3 minutes between sets

(1 leg)

3 x 5 on a 12" box (each leg)

rest 3 minutes between sets

### **Hurdle hops:**

(2 feet)

2 x 6 hurdles 27"

rest 1 minute between sets

2 feet

2 x 5 hurdles 30" - stabilize the landing

2 x 6 hurdles at 27" - continuous

## **Conclusion**

By implementing all the preceding elements into your training program, you will improve your speed and power significantly over a short period of time. This will lead to personal bests in your 40 yard dash time as well as most other aspects of your athletic training. Follow the advice given and stay within your own personal limitations. With each practice session, try to improve in each area. Train smart and you will accomplish your goals.

If you have any questions about how to implement your training, email us at: [info@athletesacceleration.com](mailto:info@athletesacceleration.com)

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