

Aerobic  
**and**  
Anaerobic  
conditioning

**Football is the total sport. Footballers are a combination of sprinters and marathon runners; they must perform with short bursts of power and speed, but also have the ability to keep going for ninety minutes or more.**

*"There have got to be times, when you're going to have to make 30 or 40, maybe even 50-odd runs, during a game. So physical fitness is very, very important."*

Alan Shearer

To be successful, players must train to increase both their speed and endurance.

The actual distance that a player covers during a game depends on playing position, team tactics and style of play, but at the final whistle, an outfield player may have travelled up to 13 km (8 miles).

**How the outfield player spends his/her 90 minutes:**

- |              |          |                   |
|--------------|----------|-------------------|
| • 18–27 mins | (20-30%) | Walking           |
| • 27–36 mins | (30-40%) | Jogging           |
| • 13–23 mins | (15-25%) | Running           |
| • 9–13 mins  | (10-15%) | Sprinting         |
| • 4–7 mins   | (4-8%)   | Walking backwards |

All this varied movement needs energy to drive the muscles of the body, particularly the legs. Energy is supplied by a special chemical (ATP) that is stored within the muscles themselves. Unfortunately the amount of ATP stored within the muscle is limited to just one second's supply, enough to perform a single shot at goal, a single jump or a single tackle.

The reason players can keep moving for ninety minutes is that the ATP used is immediately replenished. This rebuilding of energy happens in a number of different ways depending on the activity of the player. For example, if a player is sprinting, then ATP will be rebuilt using the anaerobic energy system; in a player who is jogging or walking, ATP will be rebuilt using the aerobic energy system.

**Note:** The relationship between aerobic and anaerobic energy is NOT divided precisely. Rather it is progressive with some purely aerobic activities (walking) and some purely anaerobic activities (jumping to head a ball, rapid sprint over 5 metres/yards). Most activities fall at some point along this continuum and involve some interaction between the two.

### **Anaerobic Energy System**

The anaerobic energy system works during sprinting or fast running which may last for 1–30 seconds.

- During these times, oxygen is not available to produce energy and therefore ATP is renewed by breaking down carbohydrates stored in the muscle. Although energy is produced very quickly, a substance called lactic acid is also produced which causes fatigue and muscle tiredness.
- Players can tolerate or avoid fatigue by performing anaerobic training. This consists of two components: speed training and speed endurance training.

### **So the aims of anaerobic training are**

- To improve speed and power.
- To increase the player's ability to maintain speed and power for longer during a game.
- To increase the body's ability to recover after heavy exercise.

The benefits of anaerobic training to a player will be faster acceleration, more energy and a quicker removal of lactic acid, which will cause less fatigue and improve the recovery time after sprinting.

***“When you saw Pele play, Tostao playing, Rivelino playing, they played practically with the ball at their feet. Nowadays, no. Nowadays, when you leave your marker position, you’ve got to be physically fit to get from one end of the field to the other.”***

Roberto Carlos

### **Aerobic Energy System**

The aerobic energy system is used to fuel endurance activities of a lower intensity, such as walking, jogging or running at slow to moderate speeds and is used to provide endurance. This system produces energy by supplying oxygen to the muscles. Oxygen delivery is increased by training the heart and cardiovascular system to pump blood more effectively around the body.

#### **So the aims of aerobic training are:**

- To help the body carry oxygen more effectively.
- To increase the ability of the muscle to use oxygen.
- To increase the body's ability to recover after high intensity exercise.

The benefits after a period of aerobic training will be a significant increase in the delivery of oxygen to the exercising muscle, the muscle will be better adapted to use oxygen, and there will be less of a build-up of lactic acid during exercise, and therefore less chance of fatigue.

As a player only sprints for about half a mile (850 m) during a match, much of the energy supplied comes from the aerobic system – but even though aerobic energy production is more common, it is the sprinting activity that often means the difference between winning and losing.

It is therefore very important for players to undertake both aerobic and anaerobic training.



***“When I first came into the game at 11, we’d never even heard of fitness coaches, but we had one at Blackburn and we have one at Newcastle...they’re coming into the game more and more now.”***

Alan Shearer

**How to improve your aerobic and anaerobic condition**

Before you start any conditioning it is important to memorize a few key guidelines. All good programmes are based upon five important principles:

- **Overload** Training must be sufficiently strenuous to overload the system that is being trained.
- **Progression** As your fitness improves it takes a higher level of exercise stress to make you even fitter.
- **Specific** Training has to be specific to a particular aspect of conditioning. If you want to develop sprinting speed then use anaerobic training not aerobic training.
- **Reversibility** All training effects are reversible. Remember “Use it or lose it”.
- **Recovery** Remember to allow adequate rest after training. It is during this time that the body adapts to training.

**Measuring the effect of training**

Before embarking on any training programme, it is essential to establish your level of fitness so that you can:

- monitor your rate of progress
- set training goals
- remain motivated.

**Measuring aerobic capacity**

Working out your maximum oxygen consumption reveals your aerobic capacity and level of endurance.

In this test you must attempt to run as far as possible in exactly 12 minutes. The test can easily be performed by running around a football pitch as long as the dimensions are known (the distance could be paced out if no measure is available). The formula used to calculate aerobic capacity is  $0.0225 \times \text{metres covered} - 11.3$  ( $0.0206 \times \text{yards covered} - 11.3$ ). So if you run 3000 metres in 12 minutes, your capacity is 56.2 units. Put into context, the average professional midfield player ranks at 62.4 units.

Table 1: Average aerobic capacity for different playing positions for professional and semi-professional players

**Measuring anaerobic capacity**

**30 metre (33 yard) sprint test**

Stand between two cones placed about 1 metre (1 yard) apart. From a standing start, on the count of two, one, go, sprint to a set of cones located 30 metres (33 yards) down field. The time taken from the instruction "go" to crossing the cones should be recorded.

This test measures your ability to respond to a signal and accelerate to maximum speed. It reflects your potential for rapid energy production and therefore power. Any time under 5 seconds is a good one, with professionals averaging 4.0 seconds.



**Sprintifatigue test**

On the command two, one, go, sprint from A to B, deviating sideways by 5 metres (5.5 yards) in the middle of the sprint (see page 24, Figure 2). The time from "go" to crossing the cones at B should be recorded. After crossing the cones, jog a further 10 metres (10.95 yards), round the final cones and back to the start point, taking approximately 30 seconds to get from B back to the start. As soon as you arrive back at the start, you should then sprint to B again. This cycle of events is therefore repeated once every 30 seconds. In total this is repeated seven times, with the sprint time between A and B recorded each time. The difference between fastest and slowest times reflects your ability to recover between sprints. The sideways deviation includes a component of agility into the test.

This test gives you results such as:

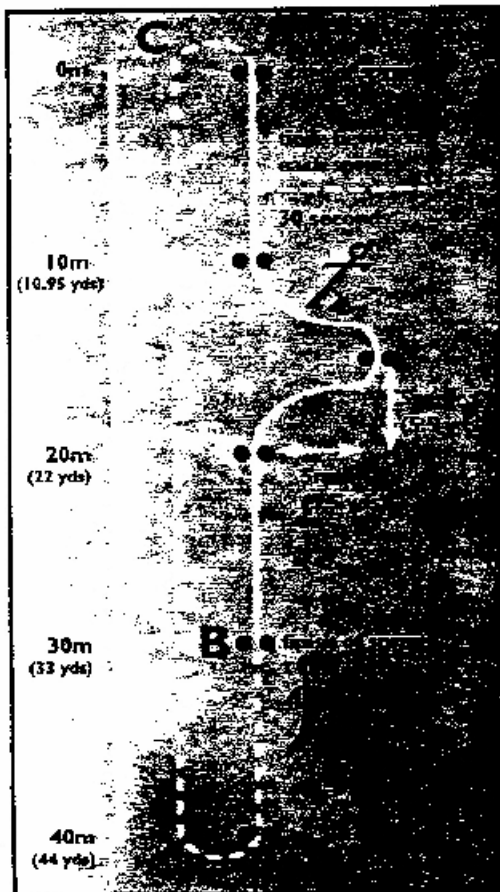
<b>Sprint</b>						
1	2	3	4	5	6	7
<b>Time (seconds)</b>						
6.73	6.88	7.01	7.14	7.35	7.50	7.65
<b>Fatigue time (slowest – fastest)</b>						
7.65 – 6.73 = 0.92 seconds						

<b>Time (seconds)</b>	<b>Best</b>	<b>Mean</b>	<b>Fatigue</b>
<b>Average</b>	6.80	7.10	0.64
<b>Range</b>	6.53–7.01	6.83–7.31	0.15–0.92

Table 2: Typical values for professional football players

Testing yourself on a regular basis allows you to see the real benefit of your aerobic and anaerobic training programme. Setting and achieving personal goals – like reducing the fatigue time in the last test – can provide real enjoyment and satisfaction.

Figure 2: Sprint/fatigue test



## Aerobic Training

Aerobic training can be achieved using:

- **continuous training** (work without rest at a moderate intensity e.g. jogging). This type of training is suitable for pre-season work.
- or
- **intermittent interval training** (work at high intensities separated by periods of rest or easier work). This type of training is more suited to late pre-season and in-season training.

## Monitoring training

As you go along, it is important to monitor your progress by measuring **heart rate**. This will ensure that you are working hard enough and will tell you how your fitness is improving. Heart rate is best measured by placing two fingers on the radial artery (which can be found in the wrist just below the base of the thumb). Alternatively, heart rate (HR) can be measured at the carotid artery in the neck (the finger should just rest lightly on the neck). Count the number of beats in 15 seconds and multiply by 4 to give the pulse rate in beats per minute.



Heart rate in training is usually lower than maximum heart rate which is calculated as **220 minus the person's age**. For example, a 20-year-old player has an estimated maximum heart rate of 200 beats per minute. If the desired intensity of exercise is 80% of that, then the target heart rate will be 160 beats per minute.



**Types of training**

**1. Low intensity aerobic training**

(i.e. early pre-season at approximately 80% of maximum heart rate)

This usually involves continuous jogging for at least 20–30 minutes three times per week. One of these sessions could include what is known as Fartlek training. This form of exercise involves running and walking at different speeds for 30–45 minutes. For example, a player may jog slowly for a couple of minutes, run at three-quarter pace for a minute and then walk to recover, before starting the cycle all over again.

**2. High intensity aerobic training**

(i.e. late pre-season and in-season at approximately 90% of maximum heart rate)

This usually involves interval training, i.e. short bursts of high activity separated by periods of lower intensity exercise and rest. The rest and recovery periods allow the work intensity during exercise to be higher than during continuous training.

See Table 3 below for an example of high intensity aerobic training.

It is important to note that the purpose of interval training is not to run yourself to exhaustion on the first repetition. The idea should be to run all repetitions at the same even pace. If you've paced your session correctly, the last repetition should be hard but you should be able to complete it without slowing down excessively at the end.

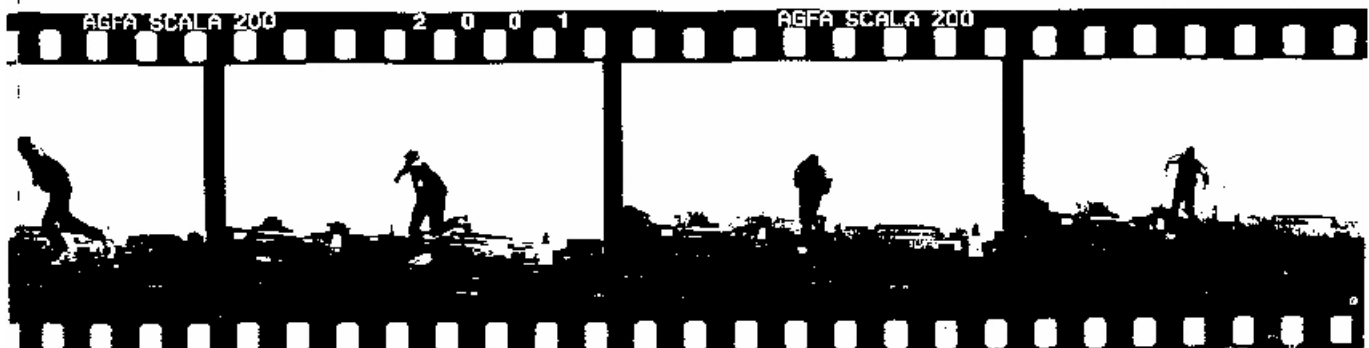
**Your best time for 3 miles continuous running is 19 minutes 30 seconds**

It would be pointless for you to try to achieve a pace of 6 minutes per mile for 3 miles (i.e. 3 miles in 18 minutes). However, you should be able to sustain that pace for half a mile, completing it in 3 minutes. This could be built into an interval session as follows:

Interval session	Repetitions	Distance	Target time
	6	x ½ mile	In 3 minutes
<b>Total distance covered = 3 miles. Time taken for total distance = 18 minutes</b>			

On completing this session you should have run 3 miles in 18 minutes, something which you would not have been able to do with continuous running.

Table 3: High intensity aerobic training



**Here are some other ideas for interval training**

*Progressive lap*

Start in the lower left corner of the pitch, jog around three sides of the pitch until you reach the lower left corner and then run at three-quarter pace, along the goal-line back to the start (see Figure 3 below). Repeat immediately, but this time jog along two and a half sides of the pitch followed by a three-quarter pace run from the halfway line back to the start (i.e. one and a half sides of the pitch). Repeat, jogging to the diagonal corner followed by a three-quarter pace run back to the start (i.e. two sides of the pitch). Continue in this manner increasing the run (three-quarter pace) by a half side of the pitch until an entire lap is completed at three-quarter pace.

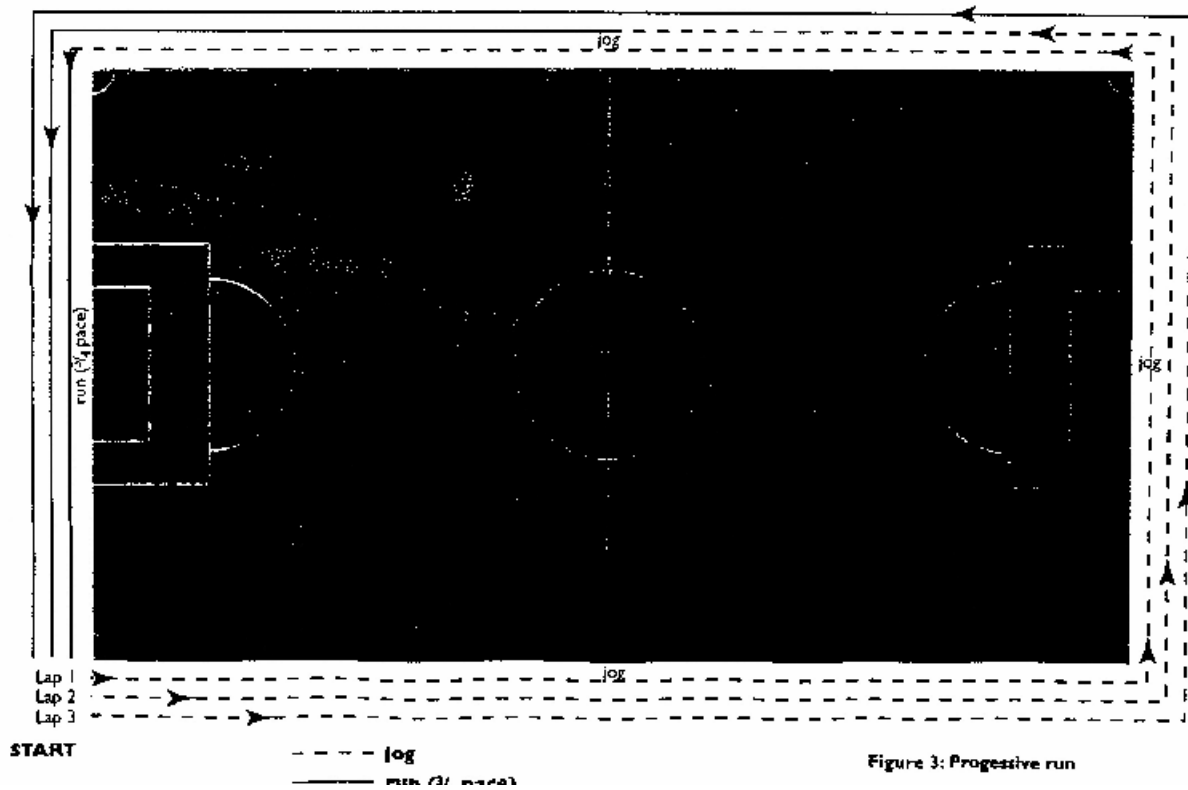


Figure 3: Progressive run



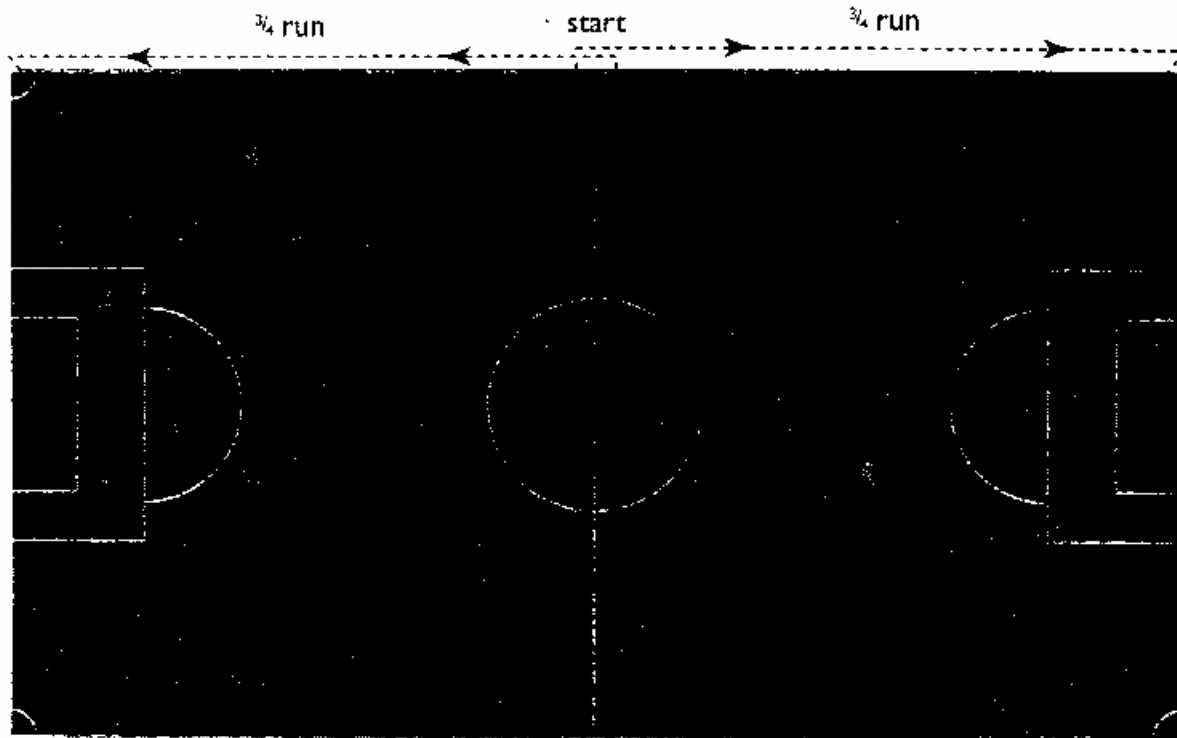


Figure 4: Diagonal running

**The next three exercises should be performed at around three-quarter pace**

#### *Diagonal running*

Start at the halfway line, run along the sideline to the corner flag; turn and run diagonally across the pitch to the junction of the halfway line and sideline. Jog along the halfway line as a recovery (see Figure 4 above). Repeat using the other half of the pitch. Repeat 3–5 times for 2–3 sets.

#### *Half pitch interval run*

Run from one goal-line to the halfway line, return and repeat immediately. This should take approximately 30 seconds and be followed by one minute's recovery (during pre-season). Recovery should be active: either ball juggle or jog slowly around the penalty area. During the season, the recovery period should be reduced to 45 seconds and then 30 seconds as fitness improves. Repeat the whole process 3–5 times per set; try to complete 2–3 sets.

#### *Penalty area run*

Start in the corner of the box and the goal-line; run along the goal-line. At the next corner of the box, jump to head an imaginary ball, land and side-step up to the 18 yard line. Run backwards across the top of the box, and then side-step down the remaining side (leading with the other leg). Continue for 1 minute and recover for 2 minutes (pre-season) and 90–60 seconds mid-season. Repeat 3–5 times for 2–3 sets.

### **3. Recovery training**

(usually at 65% of maximum heart rate)

This type of training should be undertaken the day after a match or a particularly hard training session, in order to help the recovery process. Coupled with flexibility exercises, it can help prevent the muscle soreness players commonly experience at this time. A slow recovery jog should normally be for 20 minutes at heart rate levels of 110–130 beats per minute.



Figure 5: Stepping-striding exercise

## Anaerobic Training

This consists of speed training to improve the anaerobic energy system and speed endurance work to increase the removal of lactic acid, thus reducing the recovery times after high intensity exercise.

### Types of training

#### 1. Speed training

It is important to improve speed off the mark as well as your acceleration when already moving. This can be achieved by concentrating on the power of the first few strides, and the speed of leg movement. Consequently, this type of training is only performed over short distances. Ideally, sprint training should be undertaken alongside, or after, a strength and power conditioning programme.

#### Basic repetition sprints

A typical workload for a speed-training session should be approximately 5 sets of 10 repetitions. Ten second sprints should be followed by 50 second rests to ensure quality is maintained (i.e. the work to rest ratio should be around 1:5).

### Examples of speed exercises

#### Stepping-striding exercise

Place some markers in a straight line on the ground about a metre/yard apart for a total of 10 metres (11 yds). From a standing start, run the length of the markers, taking one stride between each marker, as fast as possible. With practice, move the markers closer together to encourage faster and shorter strides (see Figure 5). Repeat 10 times. A progression can involve going from short-stride running to longer strides for the next 10 metres (11 yds), followed by regular sprinting for 10 metres (11 yds). Such exercises are useful since players have to alter their stride length continually during a game.

#### Standing start

From a standing start, accelerate as quickly as possible over 10–20 metres (11–22 yds). You can vary this by doing some other activity just before the sprint (e.g. start from kneeling or lying, pretend to jump for a header, pretend to receive a ball and lay off a pass, or make a sharp turn). Try to make the starts as realistic/match-like as possible.

See Figures 6, 7, 8 and 9.



Figure 6: Standing starts

**Running start**

As before, but you should already be moving before you start to sprint e.g. start with a 5 metre (5.5 yards) jog before exploding into a sprint or jog backwards for 5 metres (5.5 yards), turn and explode into the sprint.

**Hill sprint**

You can make each sprint harder by using an incline or bank of about 30 degrees. This helps to work on the power you can generate during the crucial first few strides. Explode up the hill for 10–20 metres (11–22 yards), then walk slowly back down for recovery. It is important to note that since hill sprints are harder you may need to allow a slightly longer recovery period in order to maintain quality.

**Downhill sprint**

From standing, sprint downhill for 10 metres/yards. The hill should be very slight. This works on the speed of leg movement, not on how you generate power. You will find that since your legs are working far faster than in an uphill sprint, this helps to improve the co-ordination of the legs when sprinting.

The following drills take slightly longer for each repetition and therefore the recovery period should also be increased. Also, you may wish to reduce the number of repetitions in each set (e.g. 3 sets of 6–8 repetitions).

**Hollow sprint**

Sprint over 30 metres/yards, jog 30 metres/yards, sprint over 30 metres/yards, jog 30 metres/yards. Walk/jog back to starting point for recovery.

**Cruise and sprint**

From the goal-line, gradually accelerate to reach top speed at the halfway line and sprint to the far 18 yard line. Stop, turn and walk/jog back to the starting point as part of your recovery. This is similar to hollow sprints except that in this sprint you progressively build up to top speed.

Figure 7:  
Standing  
start sprint



## 2. Speed endurance training

Speed endurance training allows a player to sustain a very high work intensity for longer. In order to achieve these two training effects

- You must be working flat out, or very near it. This is vital to improve anaerobic energy production.
- The duration of each repetition of a drill should last between 30 seconds and 2 minutes. The emphasis is on improving your ability to keep sprinting and enhancing your recovery from such exercise. It is therefore important to adhere as closely as possible to each drill's exercise and recovery time.

### *Hollow sprint*

Sprint and jog as before; slow down to a walk, turn and repeat immediately (this should cover the length of the pitch). Keep repeating this sequence for 2 minutes, then take 2 minutes gentle jog recovery. A total of 6–8 repetitions (1 repetition = 2 minutes work) should be a good session.

### *Cruise and sprint*

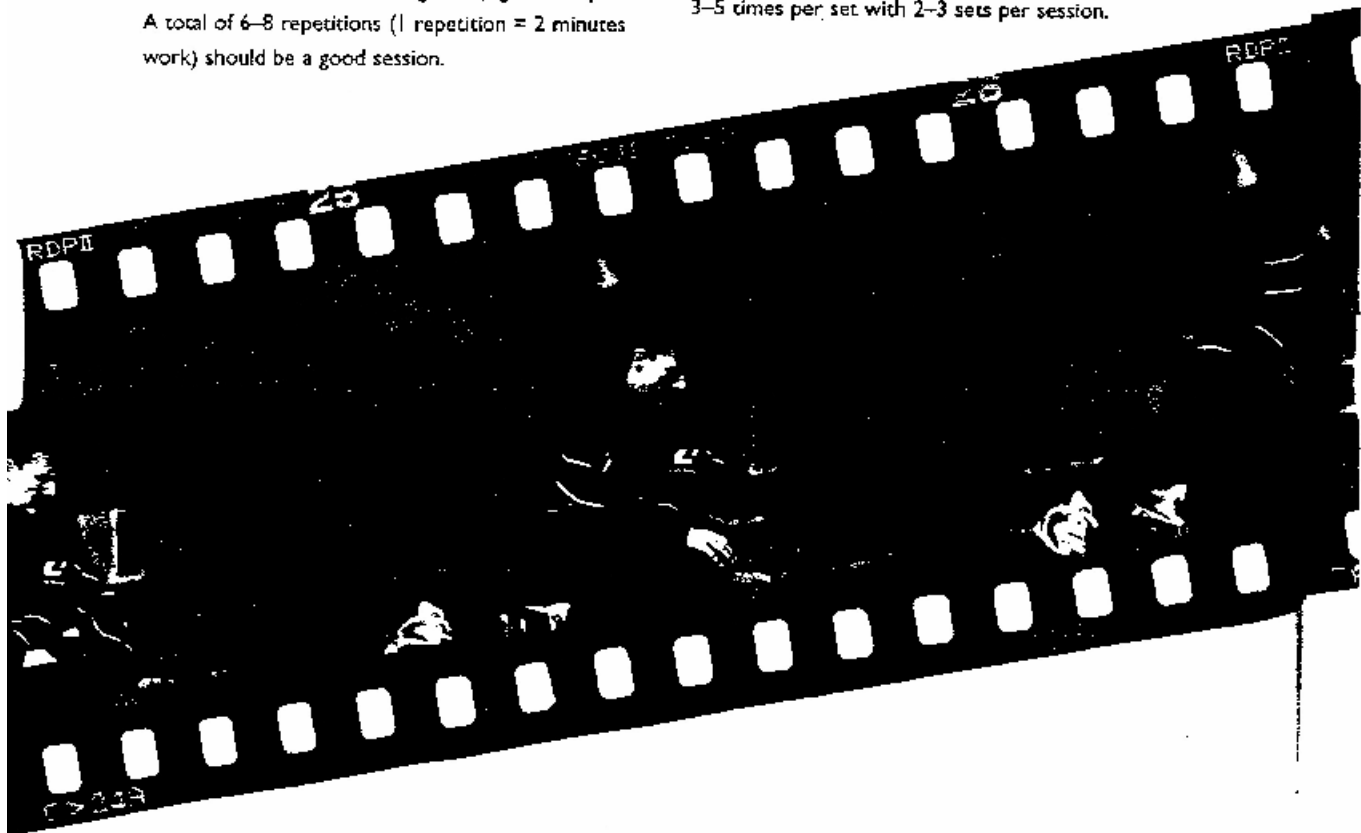
As before, from the goal-line gradually accelerate to reach top speed at the halfway line and sprint to the far 18 yard line. Slow down gradually, turn and repeat the sequence. Keep repeating this sequence for 2 minutes, then take 2 minutes gentle jog recovery. A total of 6–8 repetitions should be a good session.

### *Fast penalty sprint*

Sprint from goal-line to 6 yard line and back, penalty spot and back, 18 yard line and back, edge of the D and back. Do as much as possible in 60 seconds followed by 60 seconds recovery. Repeat 3–5 times per set with 2–3 sets per session.

### *Continuous sprint*

Sprint diagonally across the penalty area for 60 seconds followed by 60 seconds recovery. Repeat 3–5 times per set with 2–3 sets per session.



**Note:** The number of sets and repetitions highlighted in this chapter are only intended as a guideline. You can vary your training by undertaking a range of exercises in each session. For example, a 20–30 minute speed endurance training session could include 8 repetitions of the hollow sprint or 4 cruise and sprint and 4 hollow sprint repetitions, or 2 sets of 5 repetitions on the fast penalty sprints and continuous sprints respectively. Similarly, a speed

**Penalty spot run**

Start on the penalty spot. Sprint to one corner of the penalty box then back to the start, followed by a sprint to the next corner of the box and back (see Figure 10). Continue until you have completed one circuit of the penalty box then rest for 60 seconds. Repeat 5 times per set with 3–4 sets per session.

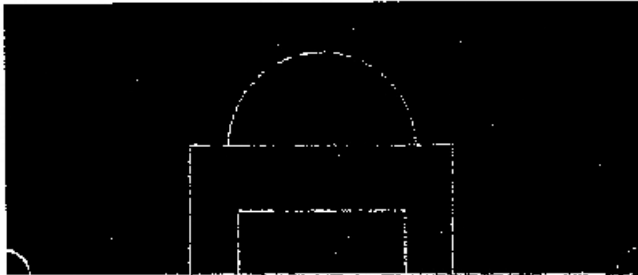


Figure 10: Penalty spot run



Figure 9: Standing start sprints

As Alan Shearer says, when asked to give young players his advice on fitness and conditioning:

***“Always enjoy it...at the end of the day, if you don’t enjoy it, then you’ll struggle. Push yourself hard but not too hard, and know when you’ve done enough, but the most important thing is that you enjoy it.”***

Sample Monday: 10-minute active warm-up and light stretch (with a partner) back-to-back, front-to-front, and side-to-side pushing for 2 sets, working the muscle, tendon, ligament strength of the entire leg. Step-in sprints. Stretch down at the end.

Sample Tuesday: 10-minute active warm-up and light stretch. Twelve North Carolinas, then cool down.

Sample Wednesday: Pick up, full field games.

Sample Thursday: 10-minute active warm-up and light stretch. Ed's 65s to 20s. Stretch down.

Sample Friday: 10-minute warm-up. 8-10 situational sprints. 20 yarders. 16 minutes of 20-20-20s. Add 2 minutes every time we do these again. Stretch down.

Saturday and Sunday: Completely off

#### TRAINING RUNS INDEX

**Regular North Carolinas.** On a soccer field, mark off a 110-yard straight run. One North Carolina is 110 yards down and back. One is run every minute in 45 seconds or less. The next N.C. will be a recovery run of 52 seconds. Repeat the process for 10-12 reps, adding an additional N.C. the next time they are done. All the athletes have to make the last 2 fast ones in 36 seconds or less or a penalty N.C. will be added.

**Advanced North Carolinas.** The same distance and times are used, but the cadence is two fast and one recover. Once again, add on penalties if everyone can't make the last two. Eight reps will usually do!

**Eds** (The kids named these, not me). On a soccer field, mark off a 65-yard distance. From one of the ends, mark off a 20-yard distance. Split the athletes into three even groups. Two groups (A and B) start at one cone, the other group (C) goes to the end of the 65. Group A starts the sprints, when they get to the end of the 65, group B goes and when they reach the starting point, group C goes, etc. After each group has done five all-out sprints, rest for one minute and move one of the cones in five yards so the next sprint is a 60-yarder. The process is repeated until a 20-yard sprint mark is reached. When the 20-yarder is reached, rest for one minute and run five all-out, rest for one minute and then run five again. If either of the last sets of 20s is done at less than maximum effort, have them run five more, until you are satisfied with the effort!

**20-20-20s.** On a soccer field, mark off a large circular "track." The object is to walk for 20 seconds, jog for 20 seconds, and then all out sprint for 20 seconds. Repeat this

cadence for 14-16 minutes to begin with, then add a minute every time you do these in the future. Try to work up to 22-25 minutes. Switch the direction of the run every 5 minutes. These are much tougher than they sound!

**Monsters.** To do this one, you have to have a decent sized hill at the end of your soccer field or running area. Mark off 120 to 140 yards from the base of the hill. On a "go" command from the coach, all the athlete's sprint the 140 all out and then hit the hill and try to sprint to the top. Once they've reached the top of the hill, they walk back down. Once they've reached the base of the hill, they have one minute, 30 seconds to walk back to the starting point. Establish a minimum time you want them to reach the top of the hill (depending on the level of athlete) and have them strive to make that time every repetition. Eight to ten reps of these will make a marathon runner cry!

**Mini Monsters.** The same as above except the sprint distance to the hill and the recovery time is cut in half. Should be able to do a couple more reps of these, compared to the full monsters.

**Step-Ins.** On soccer field, mark off a 120-yard straight distance and then mark off a 20-yard distance from one end. Split into three groups (once again, one group starts when one finishes) and start with a 120-yard sprint. The coach stays at one end and every time a group finishes a sprint at his end, he steps five steps in. This process is repeated until the coach reaches the 20-yard mark. So essentially, all the athletes will be doing a 120, 115, 110, etc., yard sprints (without stopping). Once the coach has reached the 20-yard mark rest for one minute. After one minute, run five all out 20s. Rest again and then do five more. Once the athletes have advanced far enough, reverse the process. In other words, step back out to the 120 by fives!

**Smorgashbord.** This is a simple combination of 3 different things. Example: Do five monsters and rest two minutes, six North Carolinas and rest two minutes, then step-in sprint (in only).

**Six Ball.** On a full soccer field with goals, split the athletes into two teams. Each team starts on an opposite side of the field. One team serves six balls to the other team, all at once. The team receiving the balls is trying to score on the goal defended by the servers. The servers can also steal balls from the receivers and score on their goal. Play does not stop until all six balls

are in a goal. There are no boundaries. If a player overshoots the goal, they sprint and get the ball, and punt it back into the field of play. After all six balls have been netted, reverse roles. Keep score and play two or three rounds. Demand that players attack and defend.

#### SPEED AND QUICKNESS TRAINING

I try to sprinkle some speed and quickness training in whenever I can. These are a few of my favorite drills.

**5-10-5s.** Set three cones out in a straight line. The two outside cones are 10 yards apart and the third cone is placed in the middle. Set other cones out in the same pattern, directly behind each other, about three yards apart. Players line up on the center cones so they are all facing you. Now do a variety of soccer related movements in a 5-10-5 pattern. In other words, maybe have them sprint straight ahead five yards to the outside cone, stop, then immediately run backwards half speed to the opposite far cone (10 yards), then immediately sprint back forward to the middle cone. You work on change of speed and direction. Use your imagination for combinations. This is very soccer specific.

**Running the Square.** Set four cones in a square pattern, eight yards apart. Make enough squares so three or four athletes are on a square. The lead runner of each square runs a pre-designated pattern at full speed, cutting around each cone as fast possible. When the first runners are finished, the next in line steps forward and waits for the coaches "go" command. After each player does three or four reps, change it to where they run up to the cone and plant, instead of going around, and do three or four more reps.

**Situationals.** Mark off a 20-yard sprint. Players line up at the same time and start their sprints from different starting points. After each sprint, they walk back to the starting line to recover. Use your imagination. Don't do more than 10 or 15 reps. Make it fun!

**Mirror.** Set 4 cones in a square, four yards apart. Set another four-yard square a few feet away, exactly matched up. Have athletes get into each square facing each other. Decide which one is leading and which one is following. The leaders will be touching whichever cone they want, as fast as they can and the followers will try to touch the corresponding

### Seasonal Considerations

Intensity anaerobic training cannot effectively be performed year round. Anaerobic capacities are best improved during the pre-season (anaerobic production) while being maintained (anaerobic maintenance) in-season based on the players' competitive schedule. During maintenance, a session once a week is usually recommended. There is always the idea in soccer that this

type of endurance can be maintained during the season by playing the game. It is recognized that the only way to be match fit is to play games. This is true to a certain extent, but in playing the game, there are a lot of variables that make it difficult to quantify the anaerobic work being done. Anaerobic training allows for measurable overload that a coach can administer in doses as he deems necessary in a controlled

situation. Through planning, the coach can create situations through overload where the body "super-compensates" from the workload and increases anaerobic abilities. By doing it about once a week, anaerobic maintenance is achieved.

Following are some of the exercises I use for anaerobic training and speed endurance. I have separated these into two areas, production and maintenance. [O]

#### EXERCISES FOR PRE-SEASON ANAEROBIC PRODUCTION

During pre-season, these exercises are most beneficial. Pre-season is the preferred time to train the anaerobic system. Ultimately, by the last phase of this cycle or "preseason" the players should be able to tolerate 5-8 lactic acid producing "lactate sessions" in one practice. Due to the physical and psychological demands on the players, this training should last no longer than 20 minutes. After a lactate session we recommend doing some light technical training with a ball for six to ten minutes until the athletes have recovered adequately. Following is a menu of eight exercises that can be performed during a lactate session. We use a heart rate monitor to determine heart rates of the players. This is not a widely used practice in soccer due to many circumstances; however, we feel their use allows us to better monitor the progress of our players and it is an effective motivator. Players like to see numbers and think that they are competing. If budget is a problem, consider purchasing a few of the devices and rotating them between the players.

**Exercise 1.** 300m maximal runs (90-95% MHR). Recovery: 2min of light jogging and skipping.

**Exercise 2.** Shuttle runs with markers placed at the 6yd, 18yd, midfield and opposite 18yd box. Players do "suicide" runs. Recovery: 3 min over 5 low hurdles placed 2 meters apart. Players jump and run 10m, back and forth.

**Exercise 3.** Maximal run for 35 seconds (90-95%MHR). Recovery: one-touch passing in groups of three for 3 minutes.

**Exercise 4.** Two sets of "sprint and release" runs. Players sprint to 6yd box, jog to 18yd box, sprint to midfield, stride to opposite 18yd, sprint to 6yd box, jog to end line, turn and repeat. Recovery: 3 minutes stretching.

**Exercise 5.** 200m shuttle run. Maximal run the length of a field and back. Recovery: 30m jog.

The above are longer distance runs. Other exercises can be integrated to reach the ultimate goal of 5-8 lactate sessions and can be done by performing at shorter distances.

**Exercise 6.** 2x50m (midfield) consecutive shuttle runs. Recovery: jump over 8"-42" hurdles placed in a row. Do two-footed jumps over a hurdle for 1 minute.

**Exercise 7.** 2x100m (full field) on/line to on/line and repeat shuttles. Recovery: 10 half equal jumps.

**Exercise 8.** For the final exercise, coach can be creative and add any of the above exercises to equal a total of 8 "sessions". Optimally, 8 lactate sessions can be achieved during a practice; however, in the production phase of endurance training during preseason, building up to six lactate sessions is adequate. The following is an example of a four-week cycle that includes a seven-day micro cycle illustrating the procession used to achieve this goal using the eight exercise described above.

**Week 1 day 3:** perform any 2 exercises.

**Week 2 day 2:** perform any 2 exercises, day 4 perform 1 exercise, day 6 perform 1 exercise.

**Week 3 day 1:** perform any 3 exercises, day 3 perform any 3 exercises.

**Week 4 day 2:** perform any 4 exercises, day 4 perform any 2 exercises, day 6 perform any 2 exercises.

#### EXERCISES FOR ANAEROBIC MAINTENANCE

**When performed:** During the competitive phase (in season).

**How often:** One time per micro cycle (week). Also, should not be repeated within a 48-hour period (minimal) and not before or after a game.

**Duration:** 20-25 min max.

**Exercise 1.** Maximal run (linear) for 30 seconds with recovery (jog) for 60 seconds. Then 30 second run and 45 second recovery repeat the 30 second run and incrementally decrease recovery time by 15 seconds until the work/recovery time becomes 1:1. For example: 30 seconds run, 30 seconds recovery and cool down.

**Exercise 2.** Each player is given a supply of 4 field discs (cones). Six players line up on the endline holding one cone with the remaining three on the ground. On command, the players run maximally down field with a cone as far as possible. At 30 seconds, the players place the cone where they are to mark their personal "spot" on the field. The players now have 45 seconds to return to their personal supply of cones, retrieve one and have 30 seconds to place the next cone, again in an attempt to beat their personal best. Then, they have 30 seconds to retrieve the next cone and within the following 30 seconds try to beat their best again. This is repeated until the players place all 4 cones on the field. Whichever player beats his personal best is the winner. Have six players do this at a time while the others rest such as juggling with a ball.

**Exercise 3.** Form teams of four players each. Regular goals are placed at midfield and endline. Goalkeepers in goal. Players on team 1 are on offense and place one player as a "point" about 25 yds from opposing goal. Defensive team, team 2, places a defender to mark this player. All the rest of the players on team 1 and 2 are lined up man-to-man on team 1 endline. A long ball is flighted by a team 1 player to "point" player this starts the game. "Point" player plays a first time ball back to teammates who are now rushing, with defenders toward goal. Teams attempt to go to goal and score in less than 30 seconds. If the attempt misses or scores, team 2 places a "point" man going in the opposite direction and becomes the offensive team and the game continues. Balls should be abundant and the game should go non stop for 5-minute sessions, then 1-minute recovery (active) and repeat for 4 more sessions.

The combination of energy systems used in the game of soccer and training of those systems, is unique. However, overloading of the anaerobic (lactic acid) system once a proper aerobic base is established is the most favorable means for players to make the adaptations that produce energy and then recover and overcome the fatiguing demands of the game.

Elite

# S O C C E R

## Performance Digest

### FAVORITE EXERCISES OF THE COACHES

## MARC REEVES

Assistant Soccer Coach, St. John's University, Jamaica, NY

This feature provides a small glimpse of a conditioning-related exercise that top-level coaches do to improve their players' performance. It should be understood that this is only a very small part of their formula for success. Talent, focus and dedication are just a few of the many intangibles that equate to a high level of play. Coaches should always remember to set priorities based on their team's weaknesses and to establish their own "favorite exercises" to overcome these weaknesses.

The following program was developed by Vern Gambetta.



Marc Reeves

#### The Exercises: LEG CIRCUIT

#### Why They Do It

These exercises are what sets our players apart. They are designed to allow players the leg strength necessary to take on the workloads of the season. Players who stick

difference. This series can be done by athletes on their own since it requires no special equipment. It is the responsibility of each player to get them in.

#### How They Do It

**SQUAT**  
(Hold each position ten counts)

#### START

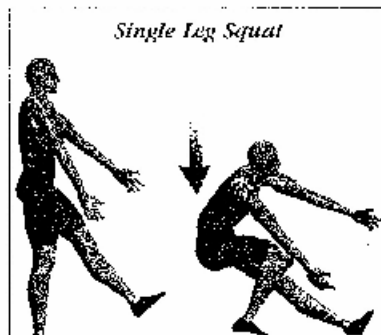
- Stand on one leg with the other leg forward, to the side, or angled for balance and variation.

#### MOVEMENT

- Squat on the supported leg proportionally bending the ankle, knee and hip. Keep weight distributed over the whole foot.
- Squat until the thigh just breaks parallel. Hold.

#### COMMON ERRORS

1. Failure to proportionally bend all three joints.
2. Weight forward on ball of the foot rather than evenly distributed.

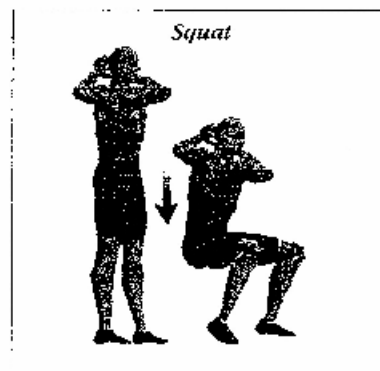


#### 3. Failure to bend at the waist

**SQUAT**

#### START

- Feet parallel, a little wider than shoulder-width and toes pointed slightly outward, back flat and tight.
- Claps hands behind head, eyes straight ahead, chest up.



#### GOING DOWN

- Quickly, but under control, bend hips backward while also bending knees and ankles.
- Inhaling, descend until tops of thighs are parallel to floor.
- Keep back straight and chest up.

#### COMING UP

- Exhale as you straighten hips and knees returning to the upright position. Entire movement should take one second.



**FAVORITE**

Continued From Page 5

- Eyes focused straight ahead.
- Back flat as possible.

**TIPS**

- Do not bounce at the bottom position.
- Do not bring knees together when coming up.

**STEP-UPS**

**START**

- Stand 12 to 18 inches from a box that is high enough to create a 90° angle at the knee when a foot is placed on top of it.
- Keep body erect.

**COMING UP**

- Inhale, then step with lead leg onto top of box placing foot in center of the box, toes straight ahead.
- Keeping body straight, shift weight to the lead leg (on the box).
- Pull body with lead leg to a standing, balanced position on the box.
- Body should be fully erect at the top position.



**GOING DOWN**

- Shift body weight to the same lead leg.
- Exhaling, step off the box with unweighted leg.
- Body should stay erect while placing foot onto the floor followed by foot of the lead leg.
- Balance feet and repeat using other leg as lead leg.

**TIPS**

- Be sure the lead leg does all the work when stepping up onto the box.

**LUNGE**

**START**

- Use same starting procedures as the squat exercise.

**GOING DOWN**

- Take one step forward. Step as long as you are tall with lead leg, keeping knee and toe in straight alignment.
- Plant foot on floor and bend at the knee in a controlled manner.
- Lower trail leg until the knee almost touches the floor, pause.



**COMING UP**

- Push off of lead leg maintaining straight leg and body alignment.
- Bring lead foot to trail foot using short steps to upright position.
- Repeat with other leg.

**TIPS**

- Lead leg should form a 90° angle at the knee. This indicates your lead leg stride is the right length.
- Trail knee should not hit the floor.
- To make it more soccer specific, vary direction of the lead leg to an angle (45°) and to the side.

**JUMP SQUAT**

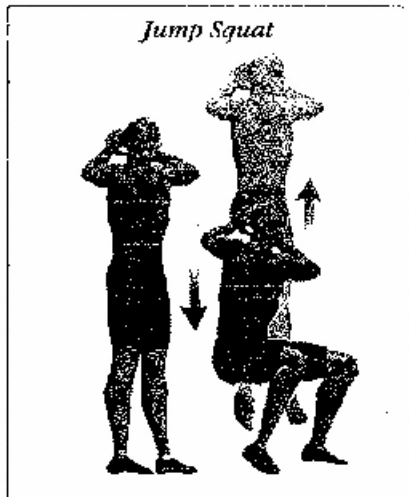
**START**

- Use same starting procedures as the squat exercise.

**GOING DOWN**

- Under control, bend hips backward, bending knees and ankles.
- Inhaling, descend slowly until tops of thighs are parallel to

- Keep back straight and chest up.



**COMING UP**

- Exhale as you straighten hips and knees returning upright in an explosive manner and raising feet off the ground, land flat-footed.
- Eyes focused straight ahead.
- Back flat as possible.
- Knees over ankles.

**TIPS**

- Do not bounce at bottom position.
- Do not bring knees together coming up.

**RECOMMENDED PROGRAM**

**MONDAY**

- 3x20, Body Weight Squats
- 3x20, Body Weight Lunges (forward, 45° angle, side)
- Do 10 per leg, alternate legs.

**WEDNESDAY**

- 3x20, Body Weight Squat Jumps.
- 2x15, Box Step Ups (one leg at a time)
- Do 15 per each leg.

**FRIDAY**

- 3x20, Single Leg Squats (forward, side, angle)
- Do 10 per leg.
- Another exercise of choice from the Monday and Wednesday groups. ●

**More Information Please!**

You can contact the author at reevesm@stjohns.edu

For a copy of their new video *Explosive Speed and Agility Drills for Soccer* by Dave Masur and John Diffley (Item #SR-143) call 800-578-4636.

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