

400 METER TRAINING
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Introduction The 400 meter dash is an endurance sprint incorporating the speed of the sprinter and the endurance of the half miler. It is considered by many to be one of the most demanding and grueling of competitive events. Usually the 400 meter runner will fall into two distinct categories--sprinter types and half-miler types. Both of these types have had their share of success over the years. Occasionally you will find an athlete who possesses some characteristics of both the sprinter and half miler.

Michael Johnson, a former Baylor University and World Champion in both the 200 and 400 meters, is a prime example of the sprinter type 400 runner. However, he has developed his strength and endurance over the years to the level now that he can better maintain his superior speed over a longer distance than his competitors.

Technique The ability to distribute one's speed and energies in the most efficient manner over the total racing distance becomes the primary concern in reaching success in the 400 meter dash. No one is capable of running the 400 meters from start to finish all out. Good pace judgment in effort and distribution is a must. Remember, the 400 meters is not a full sprint. Speed at 100 and 200 meters can be a tremendous advantage to the 400 meter runners but only if they learn to distribute these energies properly. Generally the outstanding 400 meter runner will have approximately a one second differential between their best open 200 meters and the time it takes them to run the first 200 meters of the 400 meter dash. The less experienced 400 meter runner should have approximately a two-second differential. A good formula for predicting the potential 400 meter time for 200 meter runners, providing they are willing to train and to give all they can to become a top 400 meter runner, would be to double the time of their best open 200 meters then add 3.5 seconds to this. It is obvious that the sprinter type has the advantage through the early stages of the 400 meters; however, if they are not trained properly, this advantage can melt away in a hurry toward the end of the race. The half-miler type will definitely have an advantage from the 300 meters mark on into the finish. The main reason we are seeing more of the sprinter type succeed in the 400 meters today is largely due to the fact that we are able to develop stamina and endurance more effectively than we can increase the sprinting abilities of the middle-distance runner.

Training The 400 meters is an oxygen-deficient event. This means that the level of oxygen absorption is below that which is necessary to supply the ATP (adenosine triphosphate) requirement. The energy used during the 400 meter run is derived from the breakdown of high energy phosphate compounds and from the splitting of glycogen to lactic acid. This event will rely primarily on two anaerobic systems--the ATP-PC and lactic acid systems. Physiologists have not found a good way to measure anaerobic power, and this makes it very difficult to know if one is increasing the anaerobic reserves or not. We must rely on what we have learned from the physiologists concerning the components of fatigue during the running of the 400 meter dash. This gives us input concerning the types of stress that we must deal with during both the 400 meter training sessions and competition.

Proper training will help the athlete learn to deal with the stress that they will face toward the end of the 400 meter run. We know that severe exercising imposes great stress on the body, and it must learn to adapt to this stress or it will break down. We also know that when the body is gradually put under stress, it will do whatever is necessary for its own well being to adjust to this new environment. When an organism is conditioned to the stress of athletic competition, it will be able to perform in that environment when called upon.

Training Segments The training year of the 400 meter runner will be divided into four segments:

- a) Off Season (Summer and Fall--September through December)
- b) Early competitive Season (January-February)
- c) Mid Season (March-April)
- d) Late Season (May-June)

Based on the demands of the 400 meter event, the following training workouts are recommended in varying degrees of emphasis during the training year. The time frame that each workout is used in the course of the training year is of vital importance. To derive the most from any training program, the runner must pay close attention to the proper introduction of a specific workout.

Types of Workouts

1. Speed Endurance This is running where the runner incurs a high oxygen debt, and there is a definite lactic acid buildup. This workout is vital to good 400 meter running. Distances that are run can vary from 100 to 600 meters. Number of repetitions are figured by multiplying the race distance 2 1/2 times; in this case this would be about 1000 meters. The recovery period will usually be around 10 minutes - this is to give the runner almost full recovery so that there will be quality in the runs. This drill is designed to help the lactic acid energy systems.

Examples of Speed Endurance Workouts

- | | |
|--------------------|-------------------|
| a) 10 x 100 | 5-10 minutes rest |
| b) 6 x 150 | 5-10 minutes rest |
| c) 5 x 200 | 10 minutes rest |
| d) 4 x 300 | 10 minutes rest |
| e) 3 x 350 | 10 minutes rest |
| f) 2 x 450 minutes | 10 minutes rest |

2. Tempo Endurance This aerobic workout will pay great dividends for 400 meter runners. Not only will it help them to increase their oxygen uptake, which will help to shorten their recovery time, but it will aid them in being able to accomplish more and longer workouts. This workout, since the runs are done at a slower pace, will help the runners learn rhythm; and as the workout suggests, tempo. Another vital byproduct of this workout is that it will also help to train the body to increase production of phosphate, which is a primary energy source. The emphasis in the workout should be on quantity and not on quality as is true in the aforementioned speed endurance workouts. The rest factor is generally kept short--usually 2 to 3 minutes.

Examples of Tempo Endurance Workouts

- | | |
|---------------------------|------------------------------|
| a) 8 x 200 | 2 minutes rest |
| b) 6 x 300 | 2 minutes rest |
| c) 50-100-150-200-300-350 | Walk same distance for rest. |

3. Strength Endurance This workout involves activities that will last longer than 10 seconds in duration. Such activities will include resistance running, long-hill running and stadium step runs.

Examples of Strength Endurance Workouts

- 6 x 150 meter hill
- 6 x 60 stadium steps
- 6 x 15 second duration long rope runs

4. **Endurance Running** This workout is pure aerobic running. It will consist of continuous runs of 15 to 45 minutes at a steady-state speed. Although the 400 meters only requires about 5% aerobic running, it is important to the 400 meter runners to get a good base of aerobic running in order that they can improve their oxygen uptake so that their recovery time between efforts will be cut to a minimum.

Examples of Endurance Running

- a) 15 minutes at steady-state speed
- b) 30 minutes of fartlik running
- c) 6 x 800 meters on cross country course with 3 minutes recovery time

5. **Power Speed** This workout emphasizes speed of muscle contraction. This is usually done with less than 10 repetitions and no more than 10 seconds per repetition.

Examples of Power Speed

- a) short hill runs of about 60 meters
- b) 10 x 30 meter harness runs
- c) 10 x 10 second fast rope jumps

6. **Event Running** This workout does exactly what the name implies. The runner will run different distances at a pre-determined race strategy in order to learn to work on different aspects of running the 400 meters. We also refer to this as segment running.

Examples of Event Workouts

- a) 3 x 300 meters. First 50 meters all out. Next 150 meters, relaxed floating action. All out on last 100 meters. All timed and recorded.
- b) 2 x 450 meters. The first 200 meters, 300 meters, 400 meters and final 50 meters are all timed and recorded.
- c) 1 x 350 meters. Quality run, with each segment run as if in the 400 race coming up.

7. **Speed** These workouts will vary from distances of 30 meters to 150 meters. Work will be done at full speed either on the straight-away or curve. Rest is usually long between runs in order to give full recovery so that we might receive quality performances. Relay hand-off work will count as doing speed workouts.

Example of Speed Drills

- a) 6 x 40 meter starts
- b) 6 x 60 meter flying starts
- c) 6 x sprint relay hand-offs 60 meters

8. Strength Strength workouts consist of both general and specific strength development. Our general strength development is done through the traditional weightlifting programs of both free weights and machines. We also recommend the use of plyometric drills to give us our specific weight work.

Examples of Strength Training

- a) 30 minute traditional weightlifting workout (1 set 13 reps)
- b) Explosive jumps for the development of starting power and acceleration
- c) 3 sets of 10 hops each leg
- d) fast 50 meter bounding runs with bar bell.

The following chart indicates the percentage of emphasis to be placed on the above listed workouts.

Percentage of Emphasis Chart For Workouts

<u>Types of Workouts</u>	<u>Fall</u>	<u>Early</u>	<u>Mid</u>	<u>Late</u>
Speed Endurance	75	90	100	100
Tempo Endurance	100	100	100	75
Strength Endurance	100	90	80	70
Endurance Running	100	20	10	5
Power Speed	20	60	70	80
Event Runs	25	90	100	100
Power Speed	20	60	70	80
Strength	100	100	100	100

Emphasis is given in terms of % of use recommended for each workout in relation to each segment of the training year

400 Meters

Sample Workouts

1. Fall (September through November)

- Monday**
1. Warm-up: 1 mile cross country run
 2. Flexibility exercises
 3. 2 x 600 Speed 60 sec. 400/ rest 15 minutes
 4. 3 x 300 Speed 50 sec./rest 1 minute
 5. 3 x 300 Speed 40 sec./rest 5 minutes
 6. 6. Cool down: 1 mile cross country run
 7. Weights

- Tuesday**
1. Warm-up: 1 mile cross country run
 2. Flexibility exercises
 3. 10 x 200 Speed 30 sec./rest 2 minutes
 4. 6 x 150 long hill runs Speed fast/rest, jog back
 5. Cool down: 1 mile cross country run

- Wednesday**
1. Warm-up: 1 mile cross country run
 2. Flexibility exercises
 3. 4 x 300 (Event Run) Speed 40 sec/rest 5 minutes
(50 fast—150 relaxes, 200 time 28 seconds—100
picked up fast—last 50 steady and keeping good form)
 4. 4 x 40/ rest 20 secs
 5. Cool down 1 mile cross country run
 6. Weights

- Thursday**
1. Warm-up: 1 mile cross country run
 2. Flexibility exercises
 3. 600-400-200-400-600 Speed 30 sec pace/rest 5 minutes
 4. 6 x 100 strides Speed medium/rest 1 minute
 5. Cool down 1 mile cross country run

- Friday**
1. Warm-up: ½ mile cross country run
 2. Flexibility Exercises
 3. 2-mile cross country timed run
 4. Weights

Saturday No organized practice; encouraged to do 3 miles running

Sunday No organized practice; encouraged to do 20-minute fartlik

2. Indoor Season (December-February)

- Monday**
1. Warm-up: 1 mile in and outs (100 sprint/100 walk, 3 laps, faster each lap; 4th lap run 200, 26 seconds)
 2. Flexibility Exercises
 3. 2 x 500 Speed 56 seconds 400/rest 15 minutes
 4. 2 x 200 Speed 30 seconds/ rest 30 seconds
 5. 4 x 40 Speed Quick/ rest 20 seconds
- Tuesday**
1. Warm-up: 1 mile in and outs
 2. Flexibility Exercises
 3. 8 x 200 Speed 28 seconds/ rest 3 minutes
 4. 6 x 150 long hills Speed Quick/ rest jog back
 5. Weights
- Wednesday**
1. Warm-up: 1 mile in and outs
 2. Flexibility Exercises
 3. 4 x 300 (Event Run) Speed 40/ rest 5 minutes
 4. 2 x 200 Speed 30/ rest 30 seconds
 5. 4 x 40 Speed Quick/rest 30 seconds
- Thursday**
1. Warm-up: 1 mile in and outs
 2. Flexibility Exercises
 3. 1 x 350 Speed Quick/rest 15 minutes
 4. 4 x 200 Speed 26 seconds/rest 5 minutes
 5. Weights
- Friday**
1. Warm-up: 1 mile in and outs
 2. Flexibility Exercises
 3. 3 x 200 Speed 30-29-28/rest 3 minutes
 4. 1600 relay hand-off work
- Saturday** Meet
- Sunday** No organized workout, encouraged to do some light cross country Running, about 20 minutes

3. Early Season (March-May)

<u>Monday</u>	1. Warm-up: 2. Flexibility Exercises 3. 2 x 450 4. 4 x 40 5. 2 x 200	1 mile in and outs <u>Speed</u> 52 seconds 400/<u>rest</u> 15 minutes <u>Speed</u> Quick/<u>rest</u> 30 seconds <u>Speed</u> 30 seconds/<u>rest</u> 30 seconds
<u>Tuesday</u>	1. Warm-up 2. Flexibility Exercises 3. 6 x 200 4. 4 x 40 5. Weights	1 mile in and outs <u>Speed</u> 26 seconds/<u>rest</u> 3 minutes <u>Speed</u> 30 seconds/<u>rest</u> 30 seconds
<u>Wednesday</u>	1. Warm-up 2. Flexibility Exercises 3. 4 x 350 4. 8 x 100 short hill runs 5. 2 x 200	1 mile in and outs <u>Speed</u> (28) 49 seconds/<u>rest</u> 5 minutes <u>Speed</u> fast/<u>rest</u> walk back <u>Speed</u> 30 seconds/<u>rest</u> 30 seconds
<u>Thursday</u>	1. Warm-up 2. Flexibility Exercises 3. 3 x 200 4. s x 150 (build-ups) 5. Weights	1 mile in and outs <u>Speed</u> 30 seconds/<u>rest</u> 30 seconds <u>Speed</u> slow-medium-fast/<u>rest</u> walk back
<u>Friday</u>	1. Warm-up 2. Flexibility Exercises 3. 3 x 200 4. 1600 relay hand-offs	1 mile in and outs <u>Speed</u> 26 seconds/<u>rest</u> walk 200 (mid curve)
<u>Saturday</u>	Meet	
<u>Sunday</u>	No organized practice, encouraged to do some cross country Running, about 20 minutes	

4. Late-Season (May-June)

<u>Monday</u>	1. Warm-up	1 mile in and outs
	2. Flexibility Exercises	
	3. 4 x 40	<u>Speed Quick/rest 30 seconds</u>
	4. 1 x 450	<u>Speed 50 seconds 400/rest 15 minutes</u>
	5. 2 x 200	<u>Speed 30 seconds/rest 30 seconds</u>
<u>Tuesday</u>	1. Warm-up	1 mile in and outs
	2. Flexibility Exercises	
	3. 3 x 350	<u>Speed (24) 44 seconds/rest 5 minutes</u>
	4. 2 x 200	<u>Speed 30 seconds/rest 30 seconds</u>
	5. Weights	
<u>Wednesday</u>	1. Warm-up	1 mile in and outs
	2. Flexibility Exercises	
	3. 1 x 320 (Quality run)	<u>Speed fast/rest 15 minutes</u>
	4. 3 x 200	<u>Speed 30 seconds/rest 30 seconds</u>
	5. 5 x 100 meters short hill	<u>Speed fast/rest walk back</u>
<u>Thursday</u>	1. Warm-up	1 mile in and outs
	2. Flexibility Exercises	
	3. 3 sets speed makers	<u>Speed fast/rest jog</u>
	(60 meter all out sprints – 40 meter swing down—40 meter slow jog—repeat until 4 all-out sprints are done)	3 minutes
	rest between sets	
	4. Weights	
<u>Friday</u>	1. Warm-up	1 mile in and outs
	2. Flexibility Exercises	
	3. 3 x 200	<u>Speed 26 seconds/rest walk 200</u>
	4. 1600 relay hand-offs	(Mid curve)
<u>Saturday</u>	Meet	
<u>Sunday</u>	No organized practice, encouraged to do a little cross country Running, about 20 minutes	

These workouts can be applied to all levels of 400 meter runners, but performance times given in this sample are for a potential 46-second quarter miler so adjustments should be made accordingly.

**400 Meter
Running Exercises**

<u>Exercise</u>	<u>Brief Description</u>	<u>Benefits</u>	<u>Season</u>
Endless Relay	Baton is kept moving, Rest and run are controlled	Endurance, stamina and exchange work	All
Australian Pursuits	Sprints and slow jogging for total of 3 minutes	Endurance, speed and kicking drill	All
Long hill	100 meters or more, Slow runs	Endurance, stamina and knee lift	Fall/Early
600 meters	Pace 400, pick-up last 200	Endurance, Stamina	Fall/Early
500 meters	Pace 400, pick-up last 100 meters	Endurance, stamina and knee lift	Early/Mid
350 meters	Quality and training distance add 5-7 seconds to 400 time	Mental Preparation endurance and stamina	Early/Mid and late
300 meter event	200 meters slow pace, last 100 meters faster	Mental Preparation endurance, running efficiency	Early/Mid and late
450 meters	Pace 400 and pick-up relaxed last 50 meters	Mental Preparation. endurance, stamina and knee lift	Mid/late
Short Hill	Less than 100 meters fast runs	Speed, leg drive and stamina	Mid/late
Flying 100s	Repeat 100s with Jogging	Speed, strength & running efficiency	Mid/late
320 meters	Quality distance, add 10-12 seconds for 400 time	Mental Preparation speed and running efficiency	Mid/late
Speedmaker	Short 60 meter sprints Jogging	Speed, strength & running efficiency	Mid/late
150 meter Build ups	50 meter ½ speed, 50 meter ¾ speed, 50 meter near full speed	Running efficiency, speed, endurance and mental preparation	Early/Mid and late

400 Meter Training

- I. 400 meter dash is an endurance sprint**
 - A. Sprinter speed and 800 runner endurance**
 - B. Determine type of 400 runner to be trained.**
 - 1. Speed type 200/400**
 - 2. Endurance type 400/800**
 - C. Diminish weaknesses and increase strengths**
- II. Technique of running 400 meters**
 - A. Distribute runner's speed and energies in most efficient manner over the total racing distance.**

- B. Good pace judgment is vital to good 400 success**
- C. Predict potential 400-meter times from a runner's 200-meter time.**
- D. Develop endurance versus speed development. Stamina is developed faster in sprinter than speed in 800 runner.**

III. Anaerobic versus aerobic training

- A. Past approach: 90% anaerobic and 10% aerobic**
- B. New approach: aerobic training can be as much as 40%**

IV. Deal with stress that comes at end of 400 meters.

A. Body should gradually be put under stress in training runs.

B. Repeated stress runs over several months will gradually condition the body to handle stress.

C. Moderate runs of 40 seconds will build up lactic acid.

V. Training segments (4 equal parts)

A. Off-season

B. Pre-season

C. Early season

D. Late season

VI. Key to Training: going from quantity to quality

- A. Pyramid approach**
- B. Base of aerobic running**
- C. Movement up the pyramid should be slow.**

VII. Types of 400 Work-Outs

- A. Speed endurance:**
 - 1. runner incurs a high oxygen debt.**
 - 2. runs distances of 100-600 meters. Total distance is 2 ½ times racing distance.**
 - 3. Rest 5-10 minutes.**

- B. Tempo endurance: Aerobic workout that helps increase oxygen uptake, which helps shorter recovery time.**
- 1. Doing the run slower helps runner learn tempo and rhythm.**
 - 2. Emphasis is on quantity, not quality.**
 - 3. Rest will be short.**
- C. Strength endurance: activities that last longer than 10 seconds in duration with some type of resistance running—long hills, or stadium steps.**
- D. Endurance running: Pure aerobic running. Runs of 15-45 minutes.**

- E. Power Speed: speed of muscle contraction is emphasized. Fewer than 10 seconds in duration.**
- F. Event running: runs that teach runner how the 400 should be run.**
- G. Speed: full speed runs of 30 to 150 meters. Rest is usually long.**
- H. Strength: general and specific strength development. Traditional weightlifting. Plyometric used as needed.**

VIII. Slow down and run faster

- A. Allows runner to do more running which will develop more endurance.**

B. Allows runner to take less rest between runs which in turn helps develop more endurance.

C. Protects runner from injury.

D. Stronger will mean faster.

IX. No such thing as peaking

A. Continually reloading will keep 400 runner strong, fresh and able to continue to get better.

B. Training is like putting money into bank account, and racing is like writing a check on that account.

C. runners can't lose speed if they stay strong. Speed and strength are synonymous.

- D. Testing the runner should be done in competition, not practice.**
- E. Goal should be to run fast at start of season and faster at the end.**
- F. Treat the season as if it were several mini seasons.**
- G. Better to be under-trained than over-trained.**

X. Race Strategy

A. Ideal race pattern is

--smooth deceleration

--with as little tightening up at finish as possible

B. Runner should think of the race as 4 different races

--First 100 meters pushed hard.

--Second 100 meters paced to within 1 second of best 200 time.

--Third 100 is positioning so as to be even or even ahead out of the turn.

--Fourth 100 is focused on keeping good technique and trying not to decelerate or tighten up at the finish.

XI. Summary

A. Quantity to Quality

- B. Workouts should follow progressive pattern.**
- C. Rest should be as short as possible.**
- D. Stress and lactic acid build-up comes only after a moderate run of around 40 seconds.**
- E. Event runs are very important!**
- F. Each day's workouts should help develop a specific area of 400 running.**
- G. The right 200 pace is vital to success in 400-meter running.**