

400 METER TRAINING

Clyde Hart, Head Track and Field Coach

Baylor University

Waco, Texas

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 middledistance 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 is 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 also 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

- a) 6 x 150 meter hill
- b) 6 x 60 stadium steps
- c) 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

Types of Workouts	Fall	Early	Mid	Late
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 December)

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. 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 3 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 350 (Event Run) Speed 48 sec/Rest 10 minutes
 (50 fast--1 50 relaxed, 200 time 28 seconds—
 100 picked up fast-fast 50 steady and keeping good form)
 4. 3 x 200 Speed 30-29-28 sec/Rest 3 minutes
 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: 1/2 mile cross country run
 2. Flexibility Exercises
 3. Two 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 fartlek

2. Early Season (January-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. 3 x 200 Speed 30-29-28 seconds/rest 3 minutes

5. 8 x 10 second rope jumps/rest 10 seconds, repeat

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 fast/rest jog back
 5. Weights

Wednesday 1. Warm-up: 1 mile in and outs
 2. Flexibility Exercises
 3. 4 x 300 (Event Run) speed 42/rest 5 minutes
 4. 3 x 200 Speed 30-29-28/ rest 3 minutes
 5. 6 x 10 second rope resistance runs speed fast/rest 10 seconds.

Thursday 1. Warm-up: 1 mile in and outs
 2. Flexibility Exercises
 3. 1 x 350 Speed fast/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 mins

3. Mid Season (March-April)

Monday 1. Warm-up: 1 mile in and outs
 2. Flexibility Exercises
 3. 2 x 450 Speed 52 seconds 400/rest 15 minutes
 4. 3 x 200 Speed 28-27-26/rest 3 minutes

Tuesday 1. Warm-up: 1 mile in and outs
 2. Flexibility Exercises
 3. 6 x 200 speed 26 seconds/rest 3 minutes
 4. 5 x 20 seconds long rope resistance runs speed slow/rest 3 minutes
 5. Weights

Wednesday 1. Warm-up: 1 mile in and outs
 2. Flexibility Exercises
 3. 4 x 300 (Event run) Speed 42 seconds/rest 5 minutes
 4. 8 x 100 short hill runs speed fast/rest walk back
 5. 8 x 100 short hill runs speed fast/rest walk back

Thursday 1 Warm-up: 1 mile in and outs
 2. Flexibility Exercises
 3. 3 x 200 speed 26-25-24 seconds/rest walk 200
 4. 3 x 150 (build-ups) speed slow-medium-fast/rest walk back
 5. Weights

Friday 1. Warm-up: 1 mile in and outs
 2. Flexibility Exercises
 3. 3 x 200 speed 26 seconds/rest walk 200

4. 1600 relay hand-offs

Saturday Meet

Sunday No organized practice, encouraged to do some cross country running, about 20 mins

4. Late-Season (May-June)

Monday 1 Warm-up: 1 mile in and outs

2. Flexibility Exercises

3. 1 x 450 speed 50 second 400/rest 15 minutes

4. 3 x 200 speed 26-25-24 seconds/rest walk 200

Tuesday 1. Warm-up: 1 mile in and outs

2. Flexibility Exercises

3. 4 x 300 speed 42/rest 5 minutes

4. 4 x 200 speed 28-27-26-25/rest 3 minutes

5. Weights

Wednesday 1. Warm-up: 1 mile in and outs

2. Flexibility Exercises

3. 1 x 320 (Quality run) speed fast/rest 15 minutes4. 3 x 200 speed 26-25-24 seconds/rest walk 2005. 8 x 80 meters short hill speed fast/rest walk back

Thursday 1. Warm-up: 1 mile in and outs

2. Flexibility Exercises

3. 3 sets speed makers speed fast/rest jog

(50 meter all out sprints--50 meter swing down--50 meter

slow jog--repeat until 4 all-out sprints are done) 3 minutes rest between sets4. Weights

Friday 1 Warm-up: 1 mile in and outs

2. Flexibility Exercises

3. 2 x 200 speed 26 seconds/rest walk 200

4. 4. 1600 relay hand-offs

Saturday Meet

Sunday 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

Exercise	Brief Description	Benef its	Season
Endless Relay	Baton is kept moving, mov- rest and run are controlled. and exchange work	Endurance, stamina	All
Australian Pursuits	Sprints and slow jogging for total of 3 minutes	Endurance, speed and kicking drill	All
Long hill	100 meters or more,	Endurance, stamina	Fall/Early

slow runs	and knee lift		
600 meters last 200	Pace 400, pick-up	Endurance and stamina	Fall/Early
500 meters 100 meters	Pace 400, pick-up last knee lift	Endurance, stamina and	Early/Mid
350 meters distance, all 5.5-7 second 400 time	Quality and training endurance and stamina	Mental preparation, and late	Early/Mid
300 meter event last 100 meters faster efficiency	200 meters slow pace,	Mental preparation endurance, running	Early/Mid and late
450 meters relaxed last 50 meters knee lift Short Hill fast runs	Pace 400 and pick-up endurance, stamina and Less than 100 meters stamina	Mental preparation, Speed, leg drive and	Mid/late Mid/Late
Flying Bears jogging	Repeat 100s with running efficiency	Speed, strength &	Mid/late
320 meters 10-12 seconds for 400 time efficiency	Quality distance, add	Mental preparation, speed and running	Mid/Late
Speedmaker jogging	Short 50 meter sprints running efficiency	Speed, strength &	Mid/Late
150 meter Build-ups meters near full speed	50 meter 1/2 speed, 50 meter 3/4 speed, 50	Running efficiency, speed, endurance and mental preparation	Early/Mid and late

Competing The ideal race pattern will be one of smooth deceleration if the runners have dispersed their energies properly, with as little tightening up at the finish as possible. The 400 meter runners should try to cover the first 50 meters at near top speed. At this point they should relax the actions of the upper body while still trying to maintain their leg speed. Their thoughts should be those of trying to settle into the rhythm of the race and to get a feel for their competition. They should also begin thinking about the next big effort they will make, which will be at the 200 meter mark. They should be trained and conditioned to know that at this point in their race plan, they will make a determined effort to increase the actions of their arms and to begin driving and lifting their knees, trying to resume more of a sprinting action. The runners who learn to work this turn from the 200 to the 300 meter mark will usually find themselves in good position to win the race. It is a controlled pickup, one that should allow the 400 meter runner to come off the final curve even or ahead of their opponents. During the final 100 meters of the race, the runners must learn to stay relaxed while fighting the effects of fatigue. One of the best ways to do this is by thinking of proper running technique and good form which they have been taught and concentrating on this.

Summary Before coaches plan their 400 meter workouts, they should ponder several concepts: (1) The basic concept of going from quantity to quality has not changed over the past several decades. (2) All workouts should follow a progressive pattern; you should standardize your workouts so that speed of the running distance should progressively be shortened and in some cases the rest factor as well. (3) The concept of overloading is also one

which pays dividends. An example of this would be having the 400 meter runner run 2 x 600's, coming through the 400 meters at a very slow pace. As the first 400 meters time is gradually lowered to the point that the runner has difficulty maintaining pace, the distance is lowered. At the next distance, 500 meters, the runners will run at the same pace through the first 400 meters as they were running at the previous distance. The athletes will continue this workout drill until the distance is reduced to 450 meters. This final distance will hopefully be reached by mid-season and

will be continued to the end of the year. It is suggested that the athletes run a single run as opposed to two runs before a major competition. Although the runner is getting less distance, effort is becoming greater--thus more stress is being put on the body. (4) Another factor to consider in planning 400 meter workouts is that it takes a hard run of around 40 seconds in order to incur a significant lactic acid buildup. This being the case, the ideal distance for women would be 300 meters and for men 350 meters. Most quality 400 meter runners will cover this distance in slightly over 40 seconds, thus they are working a couple of seconds into lactic acid buildup. By running this distance, the runner can accomplish several of these runs in a workout session.

Finally, the coach must become personally involved in the race strategy of the 400 meter runners and be more than just a trainer. Time the different segments of the workout runs as well as competitive races. Let the runners know beforehand what you expect them to come through the 200 meters or even the 300 meters, if necessary, in order to get an idea of what kind of pace they are keeping. Oftentimes, the race will dictate what pace the runner will have to carry in order to be competitive, but this is no excuse for not having the runner mentally ready to perform at a certain level. It will give them valuable confidence if they know they have been through different checkpoints at a certain time in practice, thus they will not have a fear of doing this in actual competition.