International Journal of Physical Education, Sports and Health 2022; 9(4): 225-228

P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (RJIF): 5.38
IJPESH 2022; 9(4): 225-228

www.kheljournal.com
Received: 25-05-2022
Accepted: 29-06-2022

Dr. Brian M Hickey
Department of Health, Physical Education & Recreation Tallahassee, Florida A&M University, FL, USA

CSCS D
Department of Health, Physical Education & Recreation Tallahassee, Florida A&M University, FL, USA

TSAC FD
Department of Health, Physical Education & Recreation Tallahassee, Florida A&M University, FL, USA

Corresponding Author:
Dr. Brian M Hickey
Department of Health, Physical Education & Recreation Tallahassee, Florida A&M University, FL, USA

International journal of physical education, sports and health re-thinking 200 m repeats as a key workout for success in the 800 m run

Dr. Brian M Hickey, CSCS D and TSAC FD

Abstract
An effective 800 m training program blends three elements: 1) tactical, 2) technical, and 3) conditioning. Often times, coaches focus solely on the conditioning aspects of workouts, and neglect the tactical and technical domains. This article: 1) provides an overview of the bioenergetics of the 800 m run, 2) examines the flaws in 200 m repeat workouts which overemphasize conditioning at the expense of technical and tactical development, 3) proposes alternatives for 200 m repeat workouts which simultaneously develop all three elements, and 4) presents a sample training cycle for the 800 m run.

Keywords: Technical skills, tactical skills, alactic pathway, lactic pathway, interval workout, repeats

1. Introduction
When designing a training program for athletic success, a coach needs to consider three domains: 1) technical, 2) tactical, and 3) strength and conditioning [1]. In middle distance running, proper running form is the primary technical skill. Tactical skills include: 1) pacing over the entire race distance, and 2) where to initiate the finishing kick. Note: the finishing kick is operationally defined as the point in the race where the athlete makes their all-out effort to the finish line. Strength and conditioning encompasses: 1) energy system development, 2) muscular strength, 3) muscular endurance, 4) flexibility and mobility, and 5) body composition.
Success in the 800 m run, is predicated on a well-developed lactate energy system. A typical training session to improve this bioenergetic pathway is 4 to 8 repeat 200 m runs with full recovery between efforts. While this workout is physiologically sound, it is flawed from the technical and tactical standpoints.
The purpose of this article is to critique 200 m repeats from the technical and tactical lenses and to provide alternative training sessions that promote enhanced racing performance.

2. 800 m Run Bioenergetics and Training Implications
Bioenergetically, the 800 m run blends anaerobic and aerobic pathways [2]. The alactic and lactic pathways operate anaerobically. ATP stored in the muscle drives muscle contraction in the alactic pathway. The lactic pathway uses glucose to produce ATP, lactate and a hydrogen ion. The aerobic pathway employs a combustion reaction adding oxygen to fuel (carbohydrates or fat) to yield a copious amount of ATP, carbon dioxide and water. When examining the aerobic/anaerobic mix it is essential to note that all three energy systems are always producing ATP. At any given time, one of the three systems is producing the majority of the ATP.
In the 800 m run approximately 2/3 of the ATP requirements comes from anaerobic sources, while the remaining 1/3 comes from the aerobic side of the bioenergetic spectrum. From a metabolic standpoint, success in the 800 m run is predicated on a well-developed lactate pathway. The athlete needs to be able to produce copious amounts of lactate and tolerate a high concentration of hydrogen ions. High intensity intervals lasting 30 to 90 seconds are ideal for these purposes.
When devising interval workouts, the following parameters need to be considered: 1) the length of the interval, 2) the total volume of intervals run, 3) the pace (intensity) of each

interval, and 4) the rest period between intervals, also known as the work to rest ratio. When designing workouts for developing the lactic pathway a 1:3 work to rest ratio is recommended [3].

A typical workout designed to improve the lactic pathway for an athlete with an 800 m personal best of 1:59 would be 4 x 400 in 59 seconds with 3 minutes recovery between intervals. In this example, the length of the interval is half of the racing distance (400 m vs. 800 m). The total volume of work performed in this interval session is 1600 m, twice the 800 m racing distance. The intensity is race pace, 59 seconds per 400. The three-minute recovery time between intervals obeys the 1:3 work to rest ratio and allows ample time for the body to clear the lactate that accumulates during each 400 m run.

Bioenergetically, the duration of a 400 m interval falls in the middle of the lactic system's range. This distance allows the athlete the opportunity to practice the tactical skill of pacing. In this example, a 200 m split of 29.5 is desirable. When done with a group of athletes, this workout is ideal for race rehearsal in terms of positioning and being comfortable running a race pace in a pack of runners.

From a technical standpoint, the 400 m distance is just long enough to create fatigue in the later stages of the interval, forcing the athlete to focus on proper running mechanics: a leg turnover of 170-180 steps per minute and an aggressive arm action emphasizing driving the elbows back.

By the time the athlete runs the third and fourth intervals they will be in a state of fatigue similar to that which is experienced at the end of a race. This will afford them the opportunity to mentally and physically rehearse scenarios to prepare them for race day success.

While this workout is highly effective in developing the lactate pathway, in observance of the training principles of overload and variation it should only be attempted once every two weeks due to the physiological stress it produces. Furthermore, this workout should be done during a week where there is no competition scheduled. The intensity and duration of this training session may produce residual fatigue which can compromise racing performance if ample recovery time is not allowed. Typically, a training session of this nature will be attempted no less than 10 days before a race.

3. Critiquing the Use of 200 m Repeats as a Training Stimulus

A staple of many 800 m training programs is 200 m runs at slightly faster than race pace with full recovery. For a 1:59 800 m runner, a typical training session of this nature would be 4-8 x 200 run in 27 to 28 seconds with 90 seconds recovery between repetitions. The 90 second recovery adheres to the aforementioned 1:3 work to rest ratio.

The physiological stress of 200 m repeats is considerably less than 400 m repeats. Consequently, coaches often program workouts comprised of 200 m repeats on a regular basis, usually two to three days before competition.

There are several flaws with this workout. From the physiological perspective, although it incorporates that lactate pathway, each repetition does not serve as a deep lactic stimulus. In fact, the lactic pathway is barely coming into full activation when the repetition ends. The ensuing full recovery resets the metabolic pathway progression and the next repetition begins using the alactic pathway.

Since each repetition is short, compared to the 800 m racing distance, it is relatively easy for an athlete to speed through the repetitions faster than race pace. There is significantly less physiological stress placed on an athlete running 8 x 200 m in 27 seconds with 90 seconds recovery between intervals than there is completing a training session of 4 x 400 m in 54 seconds with three minutes recovery between intervals.

Workouts comprised solely of 200 m repeats with full recovery pose tactical and technical issues as well. When creating a training program for an athlete, 200 m repeats are typically the last workout accomplished before a competition. For example, if an athlete has a meet on a Saturday, they might do a 200 m repeat workout on Wednesday and complete light training sessions on Thursday and Friday before Saturday's race.

From a tactical standpoint, the underlying bioenergetics allow the athlete to complete each repetition at a pace significantly faster than race pace. This tends to give the athlete a false sense of security regarding their fitness which can be manifested one of two ways in competition: 1) starting out too fast, or 2) beginning their finishing kick too soon.

Neuromuscularly, 200 m repeats can be considered an over-speed stimulus; in other words, they are completed at a pace which is faster than race pace. Since a 200 m repeat session is typically the last quality day before a race, in competition the athlete may be tempted to run their first 200 m in what they ran their 200 m repeat session in. In the above example, that would mean going through the 200 m mark with a split of 27 seconds. This is much too fast for a 1:59 800 m runner whose opening 200 m should be run in around 28.5 seconds. By running the first 200 m segment considerably faster than the intended average pace the athlete risks building overall fatigue at a faster rate than they are accustomed to, thereby resulting in a sub-standard performance.

Another tactical drawback to 200 m repeats is that they give an athlete a false sense of confidence for the later stages of a race. In training it is possible, and often prescribed, to run a 200 m repeat precipitously faster than 800 m race pace. By giving the athlete continual exposure to this stimulus, psychologically they come to believe they can begin their finishing kick 200 m from the finish line. In a training environment, the athlete fails to realize that when they get to this point in a race, their body will be deep into lactic metabolism.

Once a 1:59 800 m runner reaches the 600 m mark, they are approximately 1:30 into the race. By this point lactate is accumulating, blood pH is becoming increasingly acidic and fatigue is setting in. From the bioenergetic perspective, success over the final 200 m of an 800 m is actually predicated on aerobic capacity. As the duration of an activity increases, it becomes increasingly aerobic.

Viewing the 200 m repeat workout in the technical lens, the main flaw is that the athlete slows as they cover the distance. When allowing for full recovery between repeats, the alactic system is given the opportunity to fully recharge and the effects of lactate metabolism are mitigated. Hence the athlete starts each rep with full muscular power capacity. The first 100 m of the repeat will be fueled by the high power, alactic system before beginning a transition to the lactic pathway over the last 100 m. Note that the lactic system provides less muscular power than the alactic system. In essence, the athlete will practice slowing down over the course of each repetition. Technically, it is important to develop speed, acceleration and sprint mechanics for the finishing kick.

4. Alternatives to 200 m Repeats

Instead of using 200 m repeats, a coach has two options: 1) 300 m repeats, or 2) 150 m repeats. The 300 m distance presents several advantages over the 200 m distance. First,

this distance taxes the lactate system more heavily than the 200 m distance. A 1:59 800 m runner will run 300 m repeats in 43-44 seconds and 200 m repeats in 27-28 seconds. The 300 m distance takes approximately 15 additional seconds to cover as compared to the 200 m distance. The energy for this additional time is primarily supplied by the lactic system. The 300 m distance is not as taxing as a 400 m repeat so it is possible to do more of them in one training session. A sample workout is 4-6 x 300 at race pace using a 1:3 work to rest ratio. Last, 300 m is a long enough distance to rehearse the technical and tactical elements an athlete may encounter in a race.

The ability to accelerate under fatigue is paramount to 800 m success at the higher echelons. A 300 m repeat workout designed to develop this property is 3 x 300 with each repetition run faster than the previous one using a 1:3 work to rest ratio. This type of workout is termed a cut down workout [4]. The pace for each 300 m repeat is as follows: repeat 1 at current 800 m pace, repeat 2 at slightly faster than current 800 m pace and repeat 3 at goal 800 m pace. For a 1:59 800 m runner with a goal of 1:55 by season's end the paces for each 300 m repeat would be as follows: first repetition in 45, second repetition in 44, and last repetition in 43.

A second option is a series of 150 m repeats serving as both mental and physical rehearsal for the closing stages of an 800 m race. The 150 m distance is broken down into three 50 m segments and run in an accelerate – maintain – accelerate fashion [4]. The athlete will accelerate for the first 50 m, maintain pace and form for the next 50 m, then accelerate for the final 50 m. This session is excellent practice for the closing stages of an 800 m race. In essence it is an end of race play, similar to a set piece in football/soccer.

Many runners come to believe that once they reach the point in the race that is 50 m from the finish line, it is virtually impossible to advance their finishing position. The 150 m accelerate – maintain – accelerate workout debunks this myth. Regular use of this training session will give athletes an additional finishing burst of speed in the event's final meters, similar to a cheetah completing a successful hunt.

Since the 150 m distance is not as physiologically taxing as a 200 m repeat, an athlete can do more of them as a stand-alone session (ex. 6 x 150 m vs. 4 x 200 m) or they can be used at the end of a workout (ex. 2 x 300, 3 x 150 m). The recovery from a 150 m repeat is a walk back to the starting line (i.e. a 150 m walk).

5. Sample 14 Day Training Cycle

Table 1 outlines an example of a 14-day cycle of workouts for a 1:59 800 m runner and is representative of training sessions done during the competitive season. This period is characterized by regular racing (weekly or every other week as in this example) and a moderately high workload.

The peak cycle prepares an athlete for Championship competition; Conference and National Championship meets in American Collegiate system. During a peak training cycle, volume is pointedly reduced while intensity remains high. A full examination of a peak cycle for the 800 m transcends the scope of this article.

Periodization theory postulates that fitness cannot be advanced less than 10 days prior to a competition [4]. To wit, the most important training session of this cycle occurs 10 days prior to the meet. In this example it falls on the Wednesday of the first week.

The second week of this cycle is designed to prepare the athlete to race well on Saturday. Overall training volume decreases, yet intensity remains high. During this week athletes will realize the gains in fitness built during the previous week.

All interval workouts begin with a warm up of: 1) mobility, 2) one mile of easy jogging at 70% Maximum Heart Rate, and 3) 8 x 100 m strides followed by 100 m jog. A stride is operationally defined as a running at a very fast, yet not all out pace.

All interval workouts conclude with a cool down of two to three miles at 70% Maximum Heart Rate.

The workouts discussed in this article are in bold type. An examination of the other workouts included in this training cycle are beyond the scope of this article.

Table 1: A Sample 14 Day Training Cycle for an 800 m Runner

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Intervals at 3000 m Race Pace with 1:1 work to rest recovery A. 4 x 800 in 2:20 B. 4 x 400 in 70	AM: 30 to 45 min easy run effort/pace: 70% of Maximum Heart Rate PM: resistance training	Intervals at 800 m Race Pace with 1:3 work to rest recovery 4 x 400 in 59 seconds	AM: 30 to 45 min easy run PM: resistance training	3 x 300 m Cutdowns: 44 seconds 43 seconds 42 seconds with 2:15 recovery between intervals	30 to 45 min easy run or cross training (swim, bike, eliptical machine) at 70% Maximum Heart Rate	10 mile easy run effort/pace: 70% of Maximum Heart Rate
A. 30 min easy run effort/pace: 70% of Maximum Heart Rate B. 6-8 x 100 m strides with 100 m jog recovery	AM: 30 to 45 min easy run PM: resistance training	4 x 150 m (accelerate, maintain, accelerate) with 150 m walk recovery	10 to 15 min easy jogging	A. 10 to 15 min easy jogging B. 2 x 100 m strides	800 m Race	10 mile easy run effort/pace: 70% of Maximum Heart Rate

6. Conclusion

Effective training programs blend science and art. They are rooted in science, specifically bioenergetics and biomechanics. Artistic subtleties such as altering the repetition distance or varying the pace of each repetition can provide context and texture to a training session.

The astute track coach recognizes that training is an opportunity to physically and mentally prepare their athletes for competition. They select appropriate training stimuli to address all elements of competition: 1) technical, 2) tactical, and 3) strength and conditioning.

7. References

1. Hickey B, Ward B. The men's lacrosse 1-4-1 double mumbo: Teaching and training. Journal of Physical Education and Sports Management. 2021;8(1):66-71.
2. Hickey B. The Recharge Skate–A Tool for Expressing In-Season Repeat Sprint Ability. NSCA Coach,

2021;8(4): 6-8.
3. Parmar A, Jones T, Hayes P. The use of interval-training methods by coaches of well-trained middle-to long-distance runners. International Journal of Strength and Conditioning. 2021;1(1):1-20.
4. Dellinger B, Freeman WH. The competitive runner's training book. Collier Books, New York, 1984.