VO2 TRAINING: IDEAS FOR DISTANCE RUNNERS
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Defining “VO2 Intervals”
- 95-100 percent of VO2 Max pace
  - To make it really simple: Around 5k Race Pace
- At this pace, it takes 2 minutes to reach the point of maximum oxygen consumption
  - “High quality” work really happens when you get past this 2 minute point for each run
- An ideal period of time for VO2 Max intervals is 3-5 minutes (according to Daniels)
  - It is really difficult to go much beyond 5 minutes and stay at the correct pace
- There are negative effects of going too slow and too fast in interval workouts
  - Quote Jack Daniels: “Ideal intensity is the least stressful intensity that accomplishes what you want.”
- Variations to VO2 workouts come from manipulating the distance and recovery time
  - Intensity stays the same

Why 1000s (Ks) Are Really Good
- 5 x 1000 is a staple workout for many high school cross country programs
  - Boys and girls would usually be running 1000 meter bouts in the 3-5 min. range and the overall volume is equivalent to a 5K race.
- Bouts beyond 5 min. creates too much blood lactate accumulation in your muscles and usually leads to either:
  - running less total volume -or-
  - running slower than VO2 Max pace

Recovery Time
- Daniels recommends recovery time be equal to or less than running time
  - Example: High School boy running 5x1000 in 3:30 should get 3 ½ minutes or less recovery time.
- The shorter the interval, the less recovery time you should get (relatively speaking)
  - You want to keep heart rate and oxygen consumption levels elevated

Total Volume
- Jack Daniels recommends that VO2 Intervals not exceed 8% of weekly mileage
- This 8% rule is particularly important with younger runners.
- Example: Freshman boy running 30 miles per week and a senior boy at 50 miles per week.
- If both are 17-flat 5K runners, the tendency is for both do the same exact VO2 workout.
- Daniels would suggest that they run the same distance and pace, but that the senior boy could do 6x1000 and the freshman 4x1000.

<table>
<thead>
<tr>
<th>Weekly Mileage</th>
<th>8% of Weekly Total</th>
<th>Workout Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>2.4 miles</td>
<td>4 x 1000</td>
</tr>
<tr>
<td>40</td>
<td>3.2 miles</td>
<td>5 x 1000</td>
</tr>
<tr>
<td>50</td>
<td>4.0 miles</td>
<td>6 x 1000</td>
</tr>
<tr>
<td>60</td>
<td>4.8 miles</td>
<td>7 x 1000</td>
</tr>
</tbody>
</table>

A 5K Race is a Great VO2 Workout
- Which is a better training benefit?
  1. Running 5 x 1000 meters at 3:24 with 2:00 jog recovery (3:24 = 17:00 pace)
  2. Running 17:00 for a 5K Race (no rest)
- I would say that #2 is a better “workout”
- If you ran a hard race on Saturday and then bring the athletes back on Monday for a VO2 interval workout, consider that you are working the same exact energy system.
- Consider the cumulative effect of doing this pattern every week throughout the season.

Snider XC: VO2 Interval Approach
- About 4-5 years ago we realized we needed to adjust our approach to VO2 interval training in cross country.
- At that point we ran the standard 4-6 x 1000 meters every two weeks all fall.
- Throughout September and October our runners really improved their VO2 workout times, but their 5K times weren’t improving to the same degree.
I re-read Daniels Running Formula and his chapter on VO2 interval training. Something caught my attention: he talked about the benefit of running bouts closer to 5 minutes.

- The benefits “beyond 2 minutes”
- Our new approach: Start the season with our standard 1000 meter repeats, but we only run 1000s one time (first time we do intervals).
- Each time we run VO2 intervals we run the same pace but add 100 meters to each bout.
- In the fall we typically do VO2 intervals four times (every other week, starting around Labor Day).
- Most of our athletes run between 30-55 miles/week
  - VO2 interval volume -- 4,000-7,000 meters (8%)
- Here would be a progression for an athlete running 50 miles per week.

<table>
<thead>
<tr>
<th>Workout #</th>
<th>Time of Season</th>
<th>Workout</th>
<th>Goal Time</th>
<th>Quality Time Past 2:00</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Early Sept.</td>
<td>6 x 1000</td>
<td>3:20</td>
<td>8:00</td>
</tr>
<tr>
<td>2</td>
<td>Mid Sept.</td>
<td>5 x 1100</td>
<td>3:40</td>
<td>8:20</td>
</tr>
<tr>
<td>3</td>
<td>Early Oct.</td>
<td>5 x 1200</td>
<td>4:00</td>
<td>10:00</td>
</tr>
<tr>
<td>4</td>
<td>Mid Oct.</td>
<td>5 x 1300</td>
<td>4:20</td>
<td>11:40</td>
</tr>
</tbody>
</table>

Ladders For Variety
- One way to “mix up” a VO2 interval workout is to use different distances that work within the 3-5 minute range.
- Ladders are a common way that coaches accomplish this.
  - One example: 800-1000-1200-1000-800
  - 2nd example: 1600-1400-1200-100-800

Timed Bouts (instead of distance)
- Running for time instead of distance
- For example ... 5 x 5:00 on cross country course, each bout starting at the start line for their XC course.
- As fitness improves throughout the season, runners would get further each workout in the 5:00.

Bill Dellinger’s “30/40” Workout
- Bill Dellinger called it “advanced interval training”
- Runners do this workout on a track, alternating a 200 in 30 seconds and then a 200 in 40 seconds
- Once they fall off pace, the workout is over
- Mostly this would be a 2-3 mile workout for the Oregon runners
- Prefontaine made this workout famous, running 18 laps at 30/40. Galen Rupp has the record at 24
- Dellinger and the Oregon guys would do this workout 2-3 times during winter training
- “Hard” 200s are at mile race pace “Easy” 200s are 33% slower than that

<table>
<thead>
<tr>
<th>Athlete’s 1600 Ability</th>
<th>Hard 200s</th>
<th>Easy 200s</th>
<th>Each Lap</th>
</tr>
</thead>
<tbody>
<tr>
<td>4:20</td>
<td>33</td>
<td>42</td>
<td>1:15</td>
</tr>
<tr>
<td>4:40</td>
<td>35</td>
<td>45</td>
<td>1:20</td>
</tr>
<tr>
<td>5:20</td>
<td>40</td>
<td>55</td>
<td>1:35</td>
</tr>
<tr>
<td>6:00</td>
<td>45</td>
<td>60</td>
<td>1:45</td>
</tr>
</tbody>
</table>

Rick Weinheimer, Columbus North H.S.
- Continuous intervals (400 meter bouts with 2:30-3:30 jog recovery)
- They start these in mid-September, do them twice a week through the State Meet
- Low Set Monday, High Set Thursday
- The 400s don’t get faster through the season, the recovery jog time gets shorter and faster
- As you get more fit, recovery happens faster
- The same grass loop, flat (to compare times)
- Athletes with similar goal paces run together
- These are the only intervals they do for XC
- Once they start these continuous intervals, they stop doing their LPPM and SPPM runs
- Volume/Pace Goals based on LPPM (their long, hard “tempo” run)
- If an athlete is running an 8 mile LPPM, then you double that for their high set of 400s (16)
Subtract 4 for their low set of 400s (12)
The “Zero” mentality- Goal of the workout is to run exactly goal pace (not faster or slower).
The progression benefit comes from cutting recovery times down and doing them faster

Dennis McNulty/Joe Brooks, Warren Central H.S.
- “Slow/Fast 1000s” → A grass loop and a trails loop. Grass = fast 1000s, trails = slow 1000s.
  - Continuous running- emphasis on active recovery and elevated heart rate.
  - Set goal times for both the fast & slow loops.
  - Up to 5 sets total (so 6 miles continuous).
- Dennis McNulty: “Any interval less than 3 minutes probably isn’t helping your oxygen delivery system very much for a 5k race.”
- “Delaware Lake 800s” → 1200 meter hilly loop at Fort Harrison State Park
  - Start at the lowest elevation point – run 800 meters hard uphill, then run 400 meters easy downhill (active recovery)
  - 6-8 sets (continuous running)
- Fartlek Ladder (“changing gears”)
  - Hard and easy running time was the same
  - 1:00 hard, 1:00 easy … up to 6:00 hard/6:00 easy and back down

Larry Williams, Bloomington South H.S.
- Start interval training in early August.
- Mondays are their biggest interval days.
- Up to 8K (5 miles) in total volume.
- Example: 10x800 or 8x1000 = 8,000 meters
- The bouts range from 800 to 1600 meters with 1:00 standing recovery between each. Goal is to get athlete’s heart rate back down to 120.
- They want the intervals to be uncomfortable, but not totally all out.
- One variation:
  - 1000-2000-1000-2000-1000 … the 2Ks push the limits and focus a little more than 1Ks.
- 1600s are limited … most male athletes would be doing 1600 repeats in the 5-6 minute range. Once you get past 5 minutes, you start to lose the benefit of the workout.
- Continuous 400s are another variation for their VO2 intervals … the emphasis is still on keeping the volume high (16-20 x 400 with jog recovery).
- Pace should be the same, no matter if you’re doing 800s, 1000s, 1200s, etc.

Eric Kellison, Franklin Central H.S.
- Start in the summer with 2 x 2 mile repeats.
- In August, transition to 3-4 one-mile repeats
  - First 1200 solid pace, then hammer the last 400
- 2:00 hill repeats: up hard, down easy, 10+ sets
- “Super Ks” – a hilly, rectangle loop that is actually closer to 1100 meters
  - Small groups of 7-8 to start
  - Indian file- group stays together (team building)
  - Trim the groups down as the workout goes
- Learn to run fast early (to simulate a race)
  - Sometimes Coach K would have his athletes run the first K really hard (like in a race)
- Head to the track in October, cut intervals down to 800s (5:00 goes)
- Don’t be afraid to run really hard in practice.
- Cut downs (1/2 mile loop, run continuously)
  - Get faster each loop, finishing pretty fast
- On interval workout days, challenge and coach your athletes as if it were race day.
- Recovery – continuous jogging
Kyle Walsh, Terre Haute South H.S.
- Run VO2 intervals year-round (9 / 12 months)
- But run the workouts less often in that time
- From July-November this year, THS only ran 5 true VO2 max interval workouts
- 5K races = VO2 intervals
- Threshold/VO2 interval blend
  - 2-3 mile tempo, rest a couple of minutes, then run 3x1000 fast, then shorter strides afterward
  - Apply the fatigue of a tempo run, then hit 5K race pace intervals
- Most of the VO2 interval workouts for THS are blended with threshold work beforehand
- The goal of these workouts is to run as much time as possible at 5K race pace
- Set the recovery amount to be as short as possible to still accomplish the workout goal.
  - Always less than 1:1 recovery … 2 ½ minutes is a typical recovery time for 1000m repeats.

Scott Lidskin, Westfield H.S.
- “VO2 Prep Work” – year round
  - 200s (up to 25) @ Mile Race Pace
  - Full recovery: prepare athlete for interval running
- If a workout isn’t supposed to be VO2 intervals, be careful not to let more motivated athletes run that fast in early workouts.
- Injuries can become a higher possibility with the introduction of VO2 interval training.
- Be very careful with VO2 intervals.
- 5K Race = VO2 workout

VO2 intervals start around September 15-20
- 3-4 Tuesdays in a row (mid-Sep to mid-Oct)
- Girls only … 800s @ Northview XC Course
- Same # and same rest each week, get faster over the 4-week period of time
- Up to 1:1 time recovery (so about 3:00 rest)
- New girls run 4x800, older girls 5-6x800
- Ideally, the first interval workout will be at 5K race pace – by the 4th time you do it, hopefully you’re closer to 3200 race pace
- Occasionally 1000m repeats (with a group that is really confident and fast with the 800s)

Michael Prow, Valparaiso H.S.
- They do not do VO2 interval running until August (team camp) – establish a good base throughout the summer before VO2 training
- Often will do a “threshold mile” prior to a VO2 interval workout
- 1000s, 1200s, Mile Repeats
- DAC still runs Tuesday dual/triangular meets, so it limits number of VO2 interval workouts
- Monday fartlek runs with 2-4 min. segments of VO2-caliber running within the workout
- 3 x 5:00 with 1:1 timed recovery – top guys might hit close to a mile in 5:00, younger & JV guys would run 5:00, but a shorter distance (jog recovery, keep HR above 120)
- “Star Workout” – 1 mile repeats, 5 points to a star – out & back 5 times
  - Set up as a team competition, grouping similar abilities together – 3 sets of Star
- “Running Roulette” – draw distances and paces out of a hat, a great way to add variety while still running at VO2 intensity

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