Aerobic Work Done Right

2022 New Mexico Track & Field Clinic

“Without robust aerobic development, what you have is a sprinter.”

Eliud Kipchoge

Kenya

1:59.40

Outline of The *Aerobic Work Done Right* Presentation

- Introduction
- Periodization, Polarization, and Performance
- Aerobic capacity and aerobic power
- Using quantitative training markers in workouts
- Prescribing different aerobic effort intensities
- The training continuum
- Conclusion

Where are Aerobic Fitness Gains?

- Accidental fitness
- Non-specific fitness
- Specific fitness

Development of Specific Fitness

1. Aerobic Capacity: Mid-December to Mid-May
2. Aerobic Power: Late January to Mid-May
3. Anaerobic Capacity: March to Mid-May
4. Anaerobic Power: April to Mid-May

Periodization of Specific Fitness

1. General Preparation: Mid-December to February 1.
2. Specific Preparation: February 1 to March 10
3. Pre-Competition Period: March 10 to April 25
4. Competition Period: April 25 to May 16

2022 Polarization Training Model

- 165 days in a track season (Mid-Dec through Mid-May))
- 75% of days are low intensity runs (120 days)
- 25% of days are high intensity runs (45 days)
- Very few “medium intensity” runs

- ex. General Prep is 90% low intensity & 10% high intensity days.
- ex. Pre Comp is 60% low intensity & 40% high intensity days.
- AVERAGES OUT TO 75% AEROBIC & 25% ANAEROBIC OVER THE ENTIRE SEASON.

HS Distance Polarization Example

3200 m desired end race pace = 5:00/mile (10:00)

Season starting point = 5:30/mile (11:00)

<u>165 total sessions</u>

120 sessions @ greater than 7:30/mile

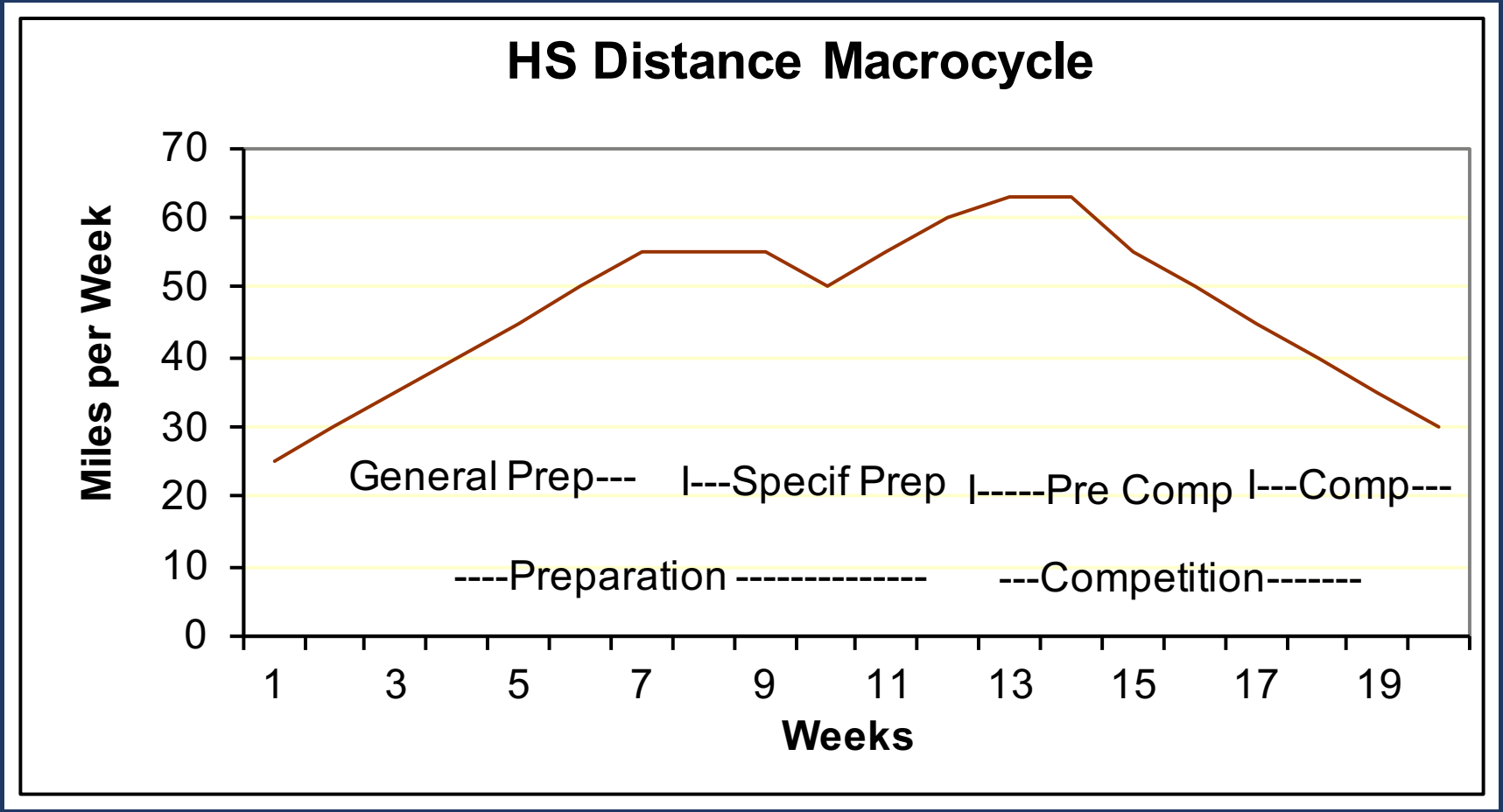
17 sessions @ 5:10-6:00/mile (includes races)

12 sessions @ less than 5:00/mile

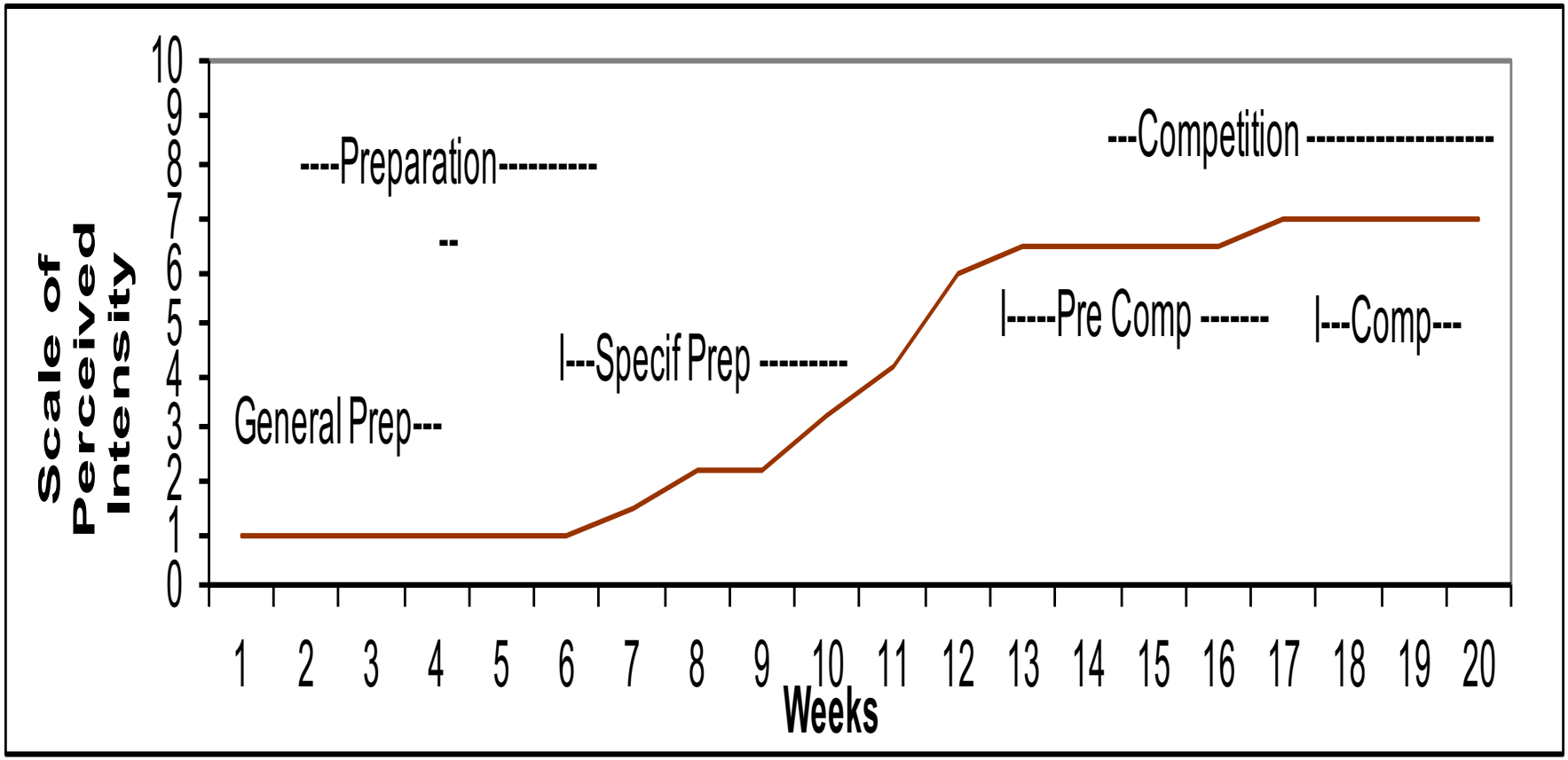
8 sessions of hill repeats (long & short hills)

8 sessions of max velocity repeats

The Distance Macrocycle As Seen Through Volume



The Distance Macrocycle As Seen Through Perceived Intensity



"Aerobic Done Right" Involves Aerobic Power ($vVO_{2\ max}$) Testing

Maintain training protocols with aerobic testing:

1. 7 minutes to exhaustion
2. 1 mile test to exhaustion
3. 2 mile test to exhaustion
4. Lactate test
5. Heart rate test

Update test data every 3 weeks

Using Test Data to Determine Aerobic Workout Intensities

- 70% of $vVO_{2\ max}$ pace is at *Aerobic Threshold* (AT)
- 85% of $vVO_{2\ max}$ pace is at *Lactate Threshold* (LT)
- 90% of $vVO_{2\ max}$ pace is at *Critical Velocity* (CV)
- 100% of $vVO_{2\ max}$ pace is at *Aerobic Power* (AP)

Using $vVO_{2\ max}$ Test Data #1

Two Mile Test

Runner A: 9:45 for 2 miles, divide in half to get 4:52 per mile $vVO_{2\ max}$ pace. Change to 292 seconds. 292/.70 for AT pace (417 seconds or 6:57/mile pace). 292/.85 for LT pace (343 seconds or 5:43/mile pace). 292/.90 for CV pace (324 seconds or 5:24/mile pace)

Using $vVO_{2\ max}$ Test Data #2

Two Mile Test

Runner B: 13:20 for 2 miles, divide in half to get 6:40 per mile $vVO_{2\ max}$ pace. Change to 400 seconds. 400/.70 for AT pace (571 seconds or 9:31/mile pace). 400/.85 for LT pace (470 seconds or 7:50/mile pace). 400/.90 for CV pace (444 seconds or 7:24/mile pace)

Using $VO_{2\ max}$ Test Data #3

One Mile Test

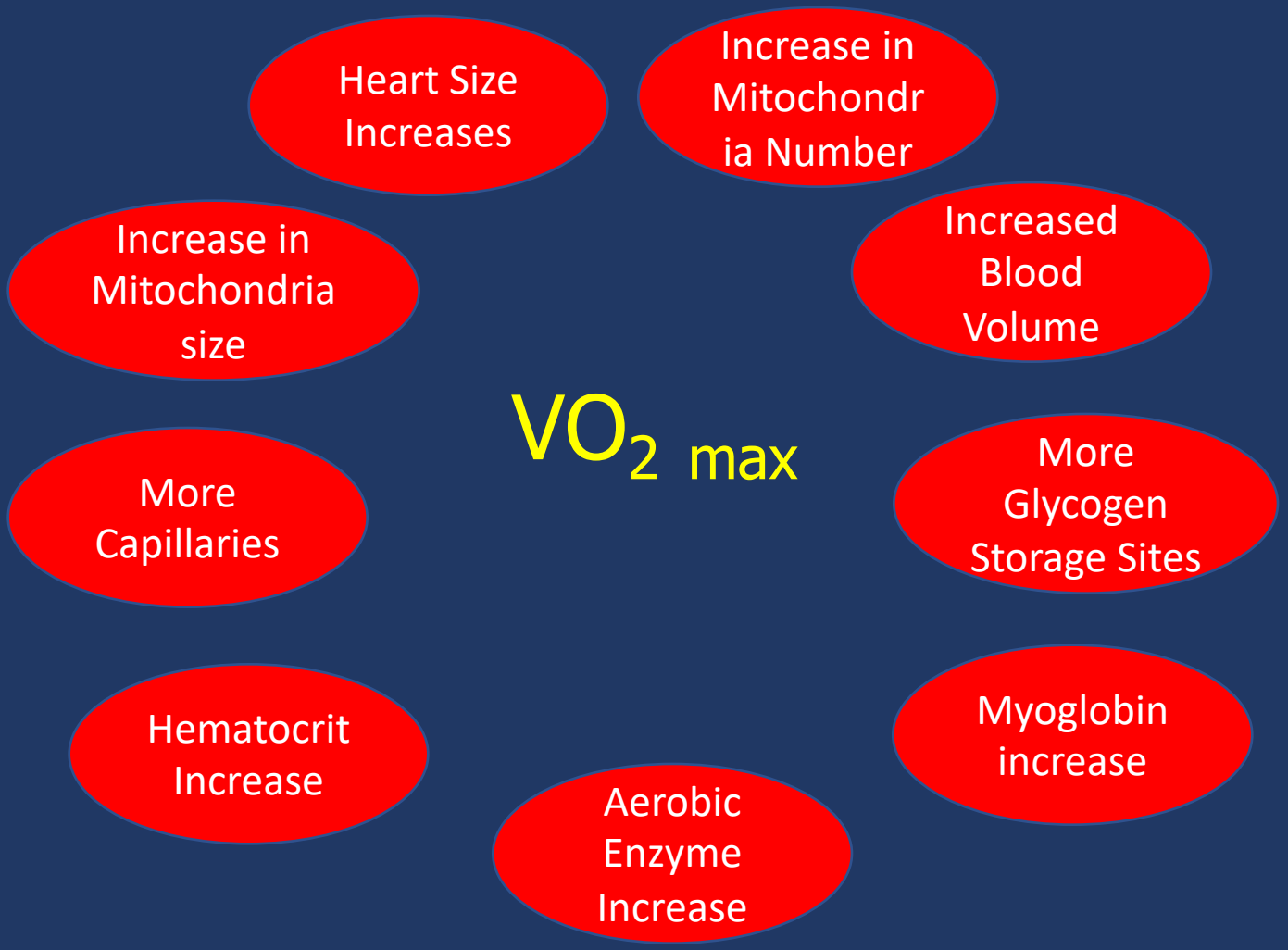
Runner C: 10:20 for 1 mile, and this is $vVO_{2\ max}$ pace. Change to 620 seconds. 620/.70 for AT pace (885 seconds or 14:45/mile pace). 620/.85 for LT pace (729 seconds or 12:09/mile pace). 620/.90 for CV pace (688 seconds or 11:28/mile pace)

Aerobic Training the Thresholds With Continuous Runs and Repeats

- Aerobic threshold (AT) pace occurs at about 65-70% of $vVO_{2\ max}$ pace. Ex. the long run, base runs, and recovery runs.

- Lactate threshold (LT) pace occurs at about 85-90% of $vVO_{2\ max}$ pace. Ex. Tempo runs, CV repeats, and longer LT runs.

- $VO_{2\ max}$ (AP) pace occurs at about 97-101% of $vVO_{2\ max}$ pace. Ex. 4 x 1 mile, 5 x 1k, 8 x 800 meter repeats.


Heart Size Increases
Increase in Mitochondria Number
Increase in Mitochondria size
Increased Blood Volume
VO_2 max
More Capillaries
More Glycogen Storage Sites
Hematocrit Increase
Myoglobin increase
Aerobic Enzyme Increase

When to Concentrate on $vVO_{2\ max}$ Work?

Aerobic Power Training Implications

- Developing a high level of aerobic power is important to an emerging distance runner.

- Central development: 70-95% of date $vVO_{2\ max}$. mileage i.e., long runs, base runs, fartlek, tempo runs.

- Peripheral Development: 97-101% of date $vVO_{2\ max}$. Repeats with controlled rest.

Central $VO_{2\ Max}$ Development

- Heart size change
- More capillaries
- Increase in hemoglobin
- Greater blood volume

Any continuous runs longer than 20 minutes contribute to development

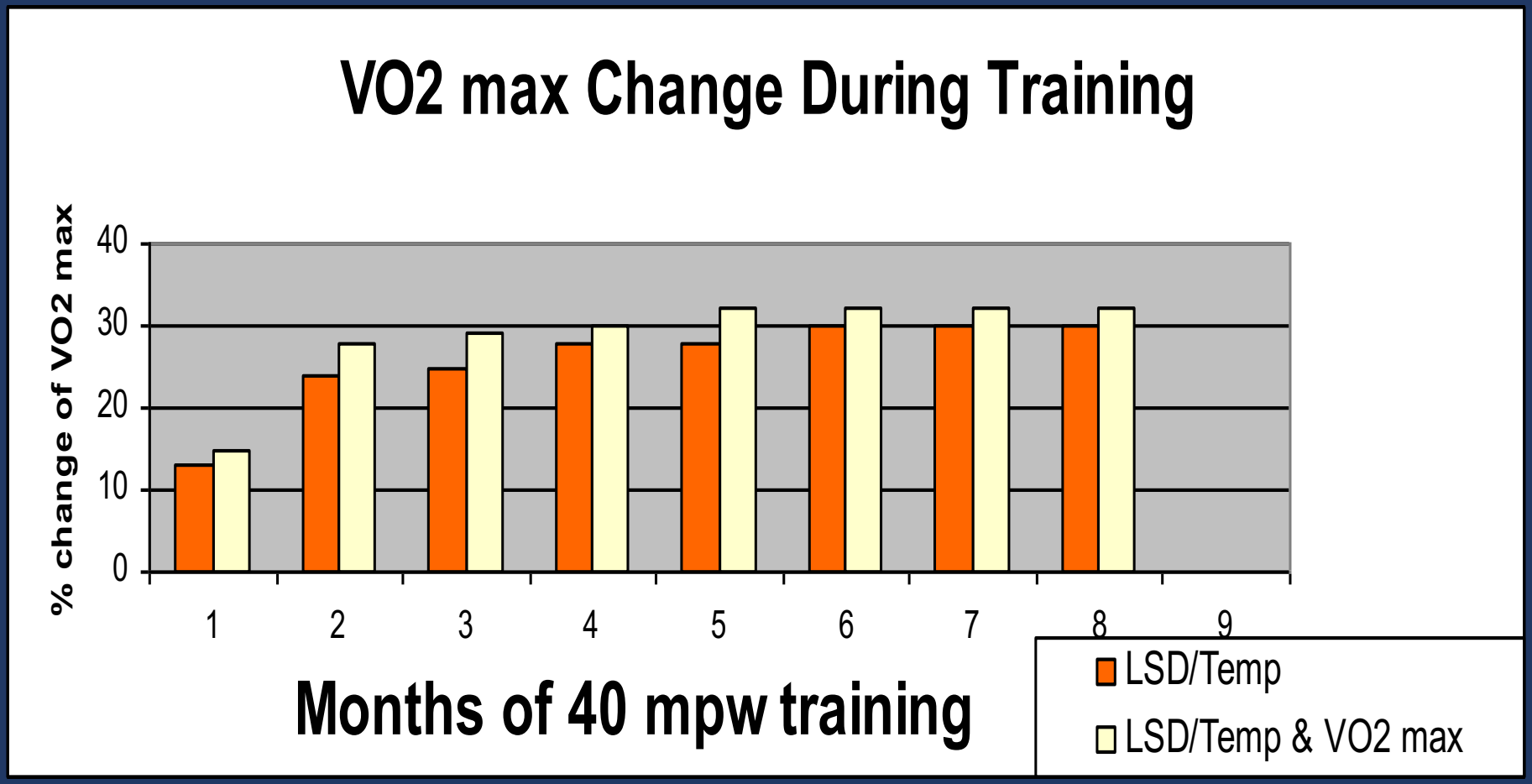
Peripheral $VO_{2\ Max}$ Development

- More mitochondria
- More mitochondria enzymes
- More myoglobin

Any runs done close (97-102%) to $vVO_{2\ max}$ pace are used for development

Aerobic Power Development

(Wilmore, Costill, and Kenney 2015)



$vVO_{2\ max}$ Session #1

- *$vVO_{2\ max}$ pace needs constant reminding to the athletes. The concept of date pace and full effort must be emphasized.*

- 2 mile active warm-up to same course or track.
- Extent of work is 4 x 1 mile. Intensity is maximum aerobic capacity effort. 2 mi/2 from last test. Record all times.
- Work time = Rest time
- 2 mile cool-down. Elevate and stretch.

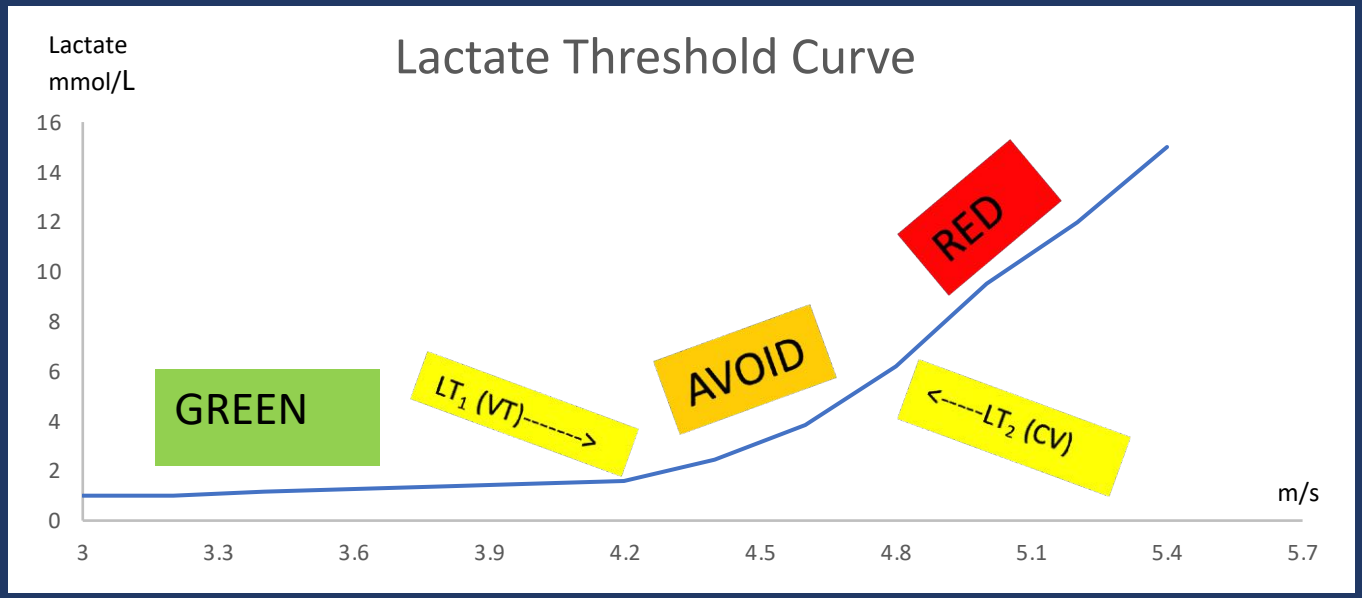
$vVO_{2\ max}$ Session #2

$vVO_{2\ max}$ pace workouts have their greatest training effect over the last half of the session.

- 2 mile active warm-up to same course or track.
- Extent of work is 7 x 800 meters. Intensity is maximum aerobic power effort. 3200 test time from last micro/divided by 4 is goal time for each bout.
- Work time = Rest time
- 2 mile cool-down. Elevate and stretch and then conditioning sticks.

CV Training: Avoiding The Middle

- All training has a cost/benefit ratio
- Training Dose → Response → Recovery → Adaptation
- 160 days → 120 green days & 45 red days (75%/25%)
- Green days = continuous runs
- Red days = interval & repetition runs



CV Training Session #1

CV pace workouts allow for greater LT adaptation over less time than a tempo run.

- 2 mile active warm-up to same course or track.
- Extent of work is 6 x 1000 meters. Intensity is 90% aerobic power ($vVO_{2\ max}$) effort. $vVO_{2\ max}$ pace in seconds divided by .90 and then scaled to 1000 meters.
- Recovery time is 80 seconds
- 2 mile cool-down.

CV Training Session #2

CV pace workouts are the slowest paced of all repetition work. Anything slower should be a continuous run.

- 2 mile active warm-up on the track.
- Extent of work is 6 x 1200 meters. Intensity is 90% aerobic power ($vVO_{2\ max}$) effort. $vVO_{2\ max}$ pace in seconds divided by .90 and then scaled to 1200 meters.
- Recovery time is 100 seconds
- 2 mile cool-down.

LT Training Session #1

LT pace workouts are the fastest paced of all continuous work. Anything faster should be a intervals or repetitions.

- Active warm-up on the track.
- Extent of work is 4 mile tempo run . Intensity is 85% aerobic power ($vVO_{2\ max}$) effort. $vVO_{2\ max}$ pace in seconds divided by .85 yields tempo pace.
- Tag work?
- Short cool-down.
- Recovery is 48 hours.

LT Training Session #2

LT pace work can be slightly lowered bringing on added strength adaptations.

- Active warm-up on the track.
- Extent of work is 6 mile LT run . Intensity is 82% aerobic power ($vVO_{2\ max}$) effort. $vVO_{2\ max}$ pace in seconds divided by .82 yields LT-2 pace.
- Tag work?
- Short cool-down.
- Recovery is 48-60 hours.

Long Run Training Session #1

The long run may be the most important aerobic training session any microcycle.

- Active warm-up on the track.
- Extent of work 20% of weekly mileage in one continuous steady state run. Intensity is 65-70% aerobic power ($vVO_{2\,max}$) effort. $vVO_{2\,max}$ pace in seconds divided by .70 yields long run pace.
- Strides
- Short cool-down.
- Recovery is 24 hours.

Long Run Training Session #2

The first 20-25 minutes of a long run yields very little adaptation for a skilled distance runner.

- Active warm-up on the track.
- Extent of work 20% of weekly mileage in one continuous variable effort run. Intensity is 65-75% aerobic power ($vVO_{2\ max}$) effort. $vVO_{2\ max}$ pace in seconds divided by .65-.70 yields variable effort long run pace.
- Strides
- Short cool-down.
- Recovery is 48-60 hours.

The Aerobic Training Continuum

% $vVO_{2\ max}$	% HR_{max}	Lactate mmol/L	RPE	Exercise
40	60	1.3	10	very slow – warmup, cool down, recovery runs
50	70	1.5	11	slow – recovery runs, early long run pace
60	75	1.8	14	moderate aerobic pace -- easy long runs
70	82	2.0	16	steady state – AT, long runs, base runs
80	88	2.5	17	half-marathon pace
85	92	3.0	17	15k pace, LT pace, tempo runs
90	94	4.0	18	10k pace, CV interval pace
95	96	8.0	19	6k pace, aerobic interval pace
100	~98	12.0	20	3k pace, $VO_{2\ max}$ intervals

Conclusion: Train Everything All Year

- Always do some fast work in every training period
- Never get far from race pace
- Move your feet fast nearly every day
- Macro-dose aerobic work for most of the year
- Micro-dose aerobic work during *Competition Period*
- Developing & maintaining $VO_{2\ max}$ is always ongoing
- Polarized training model is most effective