



400M Training

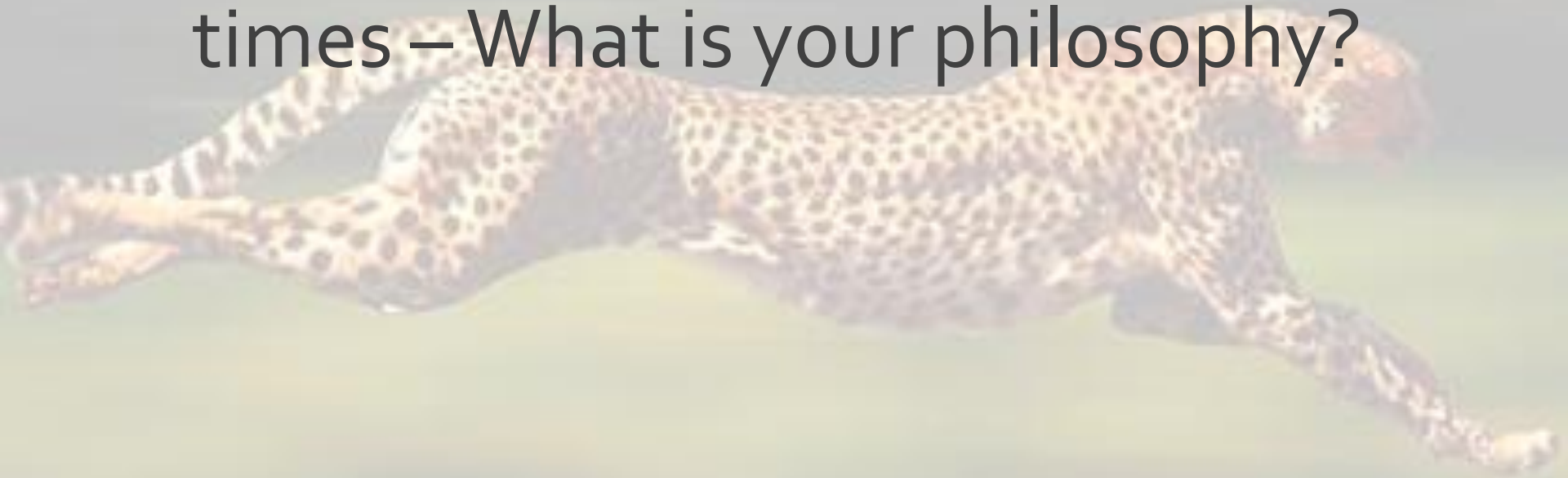
Changing The Philosophy

First – Velocity

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Part 1: The Basis for your 400M
times – What is your philosophy?



Projecting the 400M Time

It's all Math

Note: We'll use a 100m FAT time not a FAT Flying 30M which requires the equipment. Most HS's do not have a speed trap. But ALL HS's/College's can place their kid in a 100M and get a FAT time.

Women:

Youth $(100\text{m} \times 4) + 7\text{-}8 \text{ secs} = 400\text{M time}$

HS - $(100\text{m} \times 4) + 7\text{-}5.5 \text{ secs} = 400\text{M time}$

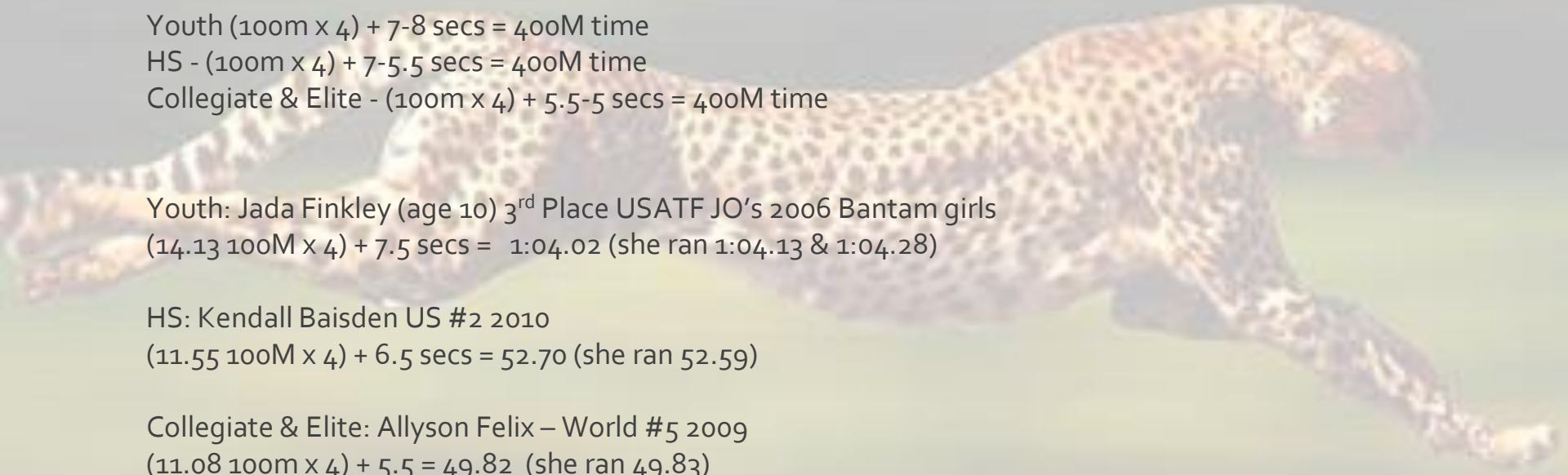
Collegiate & Elite - $(100\text{m} \times 4) + 5.5\text{-}5 \text{ secs} = 400\text{M time}$

Youth: Jada Finkley (age 10) 3rd Place USATF JO's 2006 Bantam girls
 $(14.13 \text{ } 100\text{M} \times 4) + 7.5 \text{ secs} = 1:04.02$ (she ran 1:04.13 & 1:04.28)

HS: Kendall Baisden US #2 2010
 $(11.55 \text{ } 100\text{M} \times 4) + 6.5 \text{ secs} = 52.70$ (she ran 52.59)

Collegiate & Elite: Allyson Felix – World #5 2009
 $(11.08 \text{ } 100\text{m} \times 4) + 5.5 = 49.82$ (she ran 49.83)

All times taken from the same season



Projecting the 400M Time

It's all Math

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Men:

Youth $(100m \times 4) + 7.5 - 5.5 \text{ secs} = 400M \text{ time}$

HS - $(100m \times 4) + 6.5 - 4 \text{ secs} = 400M \text{ time}$

Collegiate & Elite - $(100m \times 4) + 4 - 3 \text{ secs} = 400M \text{ time}$

Youth: Bryce Love (age 12) 1st place USATF JO's 2009 Midget boys
 $(11.56 \text{ } 100M \times 4) + 5.5 \text{ secs} = 51.74$ (he ran 51.76 & 50.75)

HS: William Henry US #20 2010
 $(10.80 \text{ } 100M \times 4) + 4 \text{ secs} = 47.20$ (he ran 47.31)

Collegiate & Elite: Tyson Gay – World #5 2009
 $(9.78 \text{ } 100m \times 4) + 5.5 = 44.70$ (he ran 44.89)

Note: If Tyson were to regularly train for the 4, he would eventually run a low 43 possibly high 42.

Most World Elite's do not optimize/compete in the 1-2-4 but will use races for supplements so differences are larger but a general idea can be captured. The optimization in a single event at world top 30 is much more difficult than at collegiate levels.

All times taken from the same season

Math & Science vs. The Eyes & Gut

Question?

If a girl runs 12.60 (FAT) in the 100M and she runs a 55.55 400M (FAT) and you need her to run 53.55 to place top 5 in conference for points. Do you emphasize/focus on/give A LOT of attention to next season:

Speed?

Speed Endurance?

Lactic Power ?

Lactic Tolerance?

Remember the math.

$12.60 \times 4 = 50.40$ secs --- so what do you do?

Answer: velocity must change because science demands it. If she is running 55.55 with a 12.60 it means as a coach you have gotten all you can from the speed endurance (short & long) and lactic power & tolerance gears. She is not going to run $50.40 + 3.10$ seconds. It is physiologically impossible. You either make her faster or she continues to run that 55 for you for entire HS or collegiate career.

Strong vs. Fast

For the 400 you need both – But...

A 400M runner needs speed endurance (long & short)

A 400M runner needs lactic power (30-45 sec intervals)

A 400M runner needs short lactic tolerance (45-75 sec intervals)

Know the math and the sequence.

Self Control - Can you not see it and know it is still there? - Reflex fear: If I train speed only to gain velocity they will get weak!!! Yep and who cares!!! Because once you begin to train the other gears (like true 400M training requires) they will be MUCH faster.

Make them fast – then stretch them.

No 12.60 100m girl will ever run 53.55 in the 400m it is physiologically impossible – therefore you must alter her velocity (top end speed gear). BUT some folks think track is about more strength. It's not. It's about more speed! Strength work is about stretching an athletes speed not making their velocity faster.

The Showdown Race – 200M

Bolt (since 2007) is a 1-2 runner

Johnson was a 4-2 runner

Bolt @ 17 ran 20.13

Bolt @ 18 (actually 17 ½) in 2004 - ran 19.93 (he was supplementing with the 400M to help his deuce)

Bolt @ 21 PR'd with a 19.75 in Kingston. He was 2nd to Gay in Osaka (2007 World's)

We see only an improvement of .18 over 4 seasons with a tremendous amount of physical maturation occurring between 17 & 21 + combined with extensive world experience. Why so little improvement?

2 items to note:

Bolt had optimized his velocity (top-end gear) over 200M. And since he was supplementing with the 400M consistently; he was very strong. Plenty of speed endurance, lactic power and lactic tolerance in the tank. In other words his top-end gear never got faster. That flying 30M stayed relatively the same over 4 years.

Results: 19.75 was the max speed over 200M with his current velocity AND he was getting smoked by Gay on a regular basis!!! Hint: Gay is a 1-2 guy. Which means he supplements his deuce with the 1. Which means he is always improving and working on his velocity.

The Showdown Race – 200M

The Change:

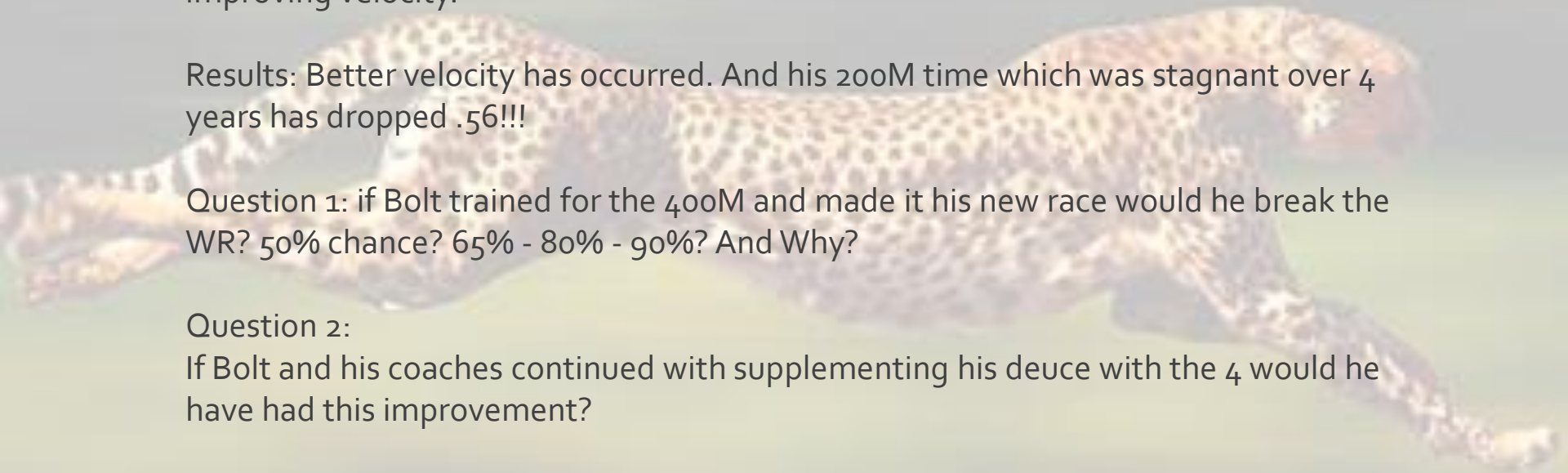
In 2008 Bolt and his coaches made a change. They focused on the 100M to help improve his first 100M against Gay in the 200M. Tyson was blowing him up over the first 60M on the turn (watch the 200M final in Osaka). In 2008 we saw Bolt running the 100M ALOT and his training was in accordance with a 1-2 runner. Which means always working on improving velocity.

Results: Better velocity has occurred. And his 200M time which was stagnant over 4 years has dropped .56!!!

Question 1: if Bolt trained for the 400M and made it his new race would he break the WR? 50% chance? 65% - 80% - 90%? And Why?

Question 2:

If Bolt and his coaches continued with supplementing his deuce with the 4 would he have had this improvement?



The Showdown Race – 200M

Bolt versus Johnson - or Gay versus Johnson

Both Gay and Bolt per average race dominate Johnson at the deuce.

Note: Seasons selected over a 5 yr window and 1 year after their lifetime PR race

Bolt: 1-2 runner (2008-2010)

2010 19.56 -0.8 Kingston (NS), JAM 01/05/2010

2009 19.19 -0.3 Berlin 20/08/2009

2008 19.30 -0.9 Beijing (National Stadium) 20/08

Since Bolt became a 1-2 runner.

2007 19.75 0.2 Kingston (NS), JAM 24/06/2007

2006 19.88 0.4 Lausanne 11/07/2006

Gay: 1-2 runner

2010 19.72 0.1 Monaco 22/07/2010

2009 19.58 1.3 New York City, NY 30/05/2009

2008 20.00 1.2 Kingston (NS), JAM 03/05/2008 (note: hammy injury in '08)

2007 19.62 -0.3 Indianapolis, IN 24/06/2007

2006 19.68 -0.1 Stuttgart 10/09/2006

Johnson: 2-4 runner

1997 20.05 0.0 Des Moines, IA 26/04/1997

1996 19.32 0.4 Atlanta, GA 01/08/1996

1995 19.79 0.5 Göteborg 11/08/1995

1994 19.94 0.0 Monaco 02/08/1994

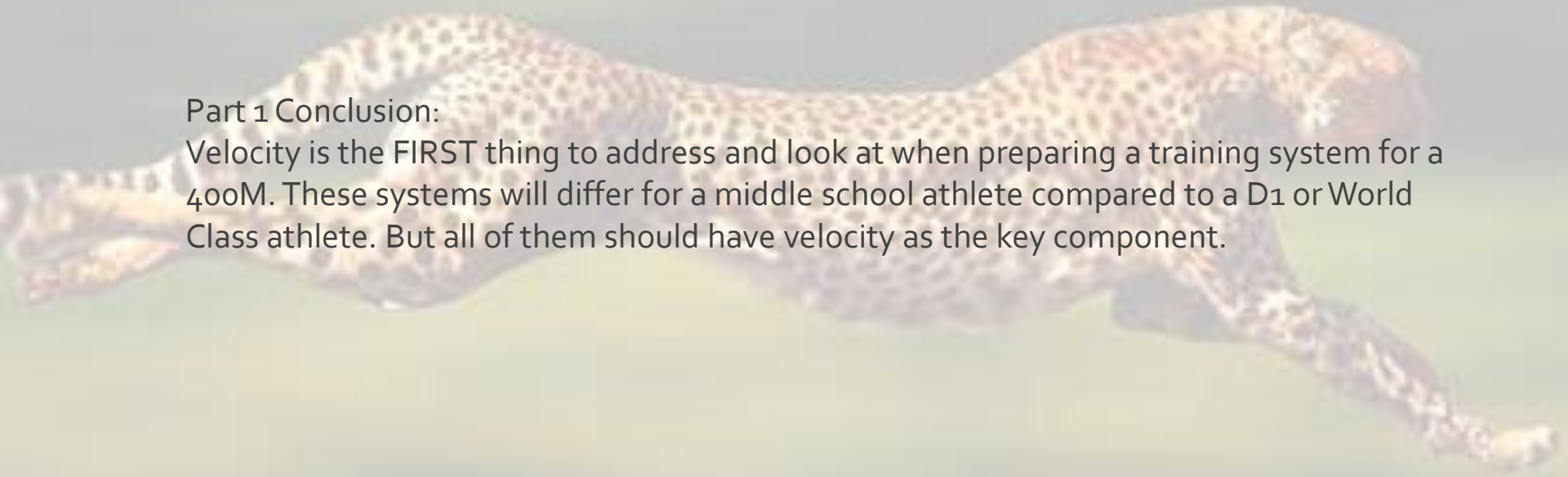
1993 20.06 1.1 Lausanne 07/07/1993

Bolt & Gay @ 400M

The reason we would give Bolt & Gay a better than 75-80% odds in breaking Johnson's 400M record is because they are faster human beings – in other words they have better velocity.

Part 1 Conclusion:

Velocity is the FIRST thing to address and look at when preparing a training system for a 400M. These systems will differ for a middle school athlete compared to a D1 or World Class athlete. But all of them should have velocity as the key component.



Part 2: The 400M



400M Race Model

0-50: Meters-Big hands - push phase -drive hard for the free ride. 0-50M, 50-150M, is the where the low end phosphate workouts are.

50-150: Meters-Carry Phase #1-Fast float-off the turn and run through it. Relaxed arms and nice striding.

150-200: Meters-Get the arm ready for another aggressive arm swing.

200-250: Meters-Run into the turn with good elbow pump and maintain this action without over doing it. If you feel like your running the same speed on the turn-you're slowing down.200M-250M, belongs to the extended phosphate workouts

250-310: Meters-Start to change to a quicker arm pump and come off the turn with frequency. Always run this off the run and into the straight. 250M-310M, 310M-360M, 360M-400M are the lactate power/capacity and will power workouts. This causes a high degree of pain and most people don't enjoy it!

310-360: Meters-Carry Phase #2-Relax and keep the hands out of your face.

360-400: Meters-Guts, Glory, MOM, Apple Pie, Gluteus Lock. Frequency is the key here. (Snare drum arm swing).

Training Sequence

3 Approaches

Approach #1:

Focus on Speed development in order to make a superior 400M runner in the future. Spend a whole season (not 4-6 weeks on velocity). Note: If you do this it is a double dip. You get superior velocity AND superior form. Come back year 2 trigger the speed and then stretch. You will be pleased with the results unless they swim in the offseason 😊

Approach #2:

Focus on Speed development for the entire first half of the season. Then stretch it. I've done this. It is a balancing act in making them strong enough for the big meet. Payoff is a much bigger speed reserve when they cross 200M mark in the race. Should 2-2.5 seconds above their 200M PR. But gotta make sure they can finish.

Approach #3:

Train the 400M for the existing season – balanced diet: speed-speed endurance-lactic power-lactic tolerance

Part 3: What to workout – How to workout & Sample workouts



First - Energy Systems (Running Ingredients)

TRAINING ENERGY SYSTEMS

Duration of Session Effort	Energy System(s)	Power/Capacity	Training Effect
0 to 0.2 sec.	Nervous	----	Reaction
0 to 0.2 sec. (per leg)	Alactic (Stored muscle ATP)	Power	Initial Thrust
0 to 0.1 sec (speed)	Alactic (CP system)	Power	Single leg thrust at top
1 to 2.0 sec	Alactic (nervous + stored ATP + CP)	Power	Starts
2 to 5.0 sec	Alactic (CP system)	Power	Acceleration
5 to 15 sec	Alactic (CP system)	Power	Maximum speed (flying start)
15 to 30 sec	Alactic (extended CP system)	Capacity	Speed endurance (ability to hold 95%)
30 to 45 sec	Lactic	Power	Ability to produce energy w/ot O ₂ or CP
45 to 90 sec	Lactic	Capacity	As above + ability to tolerate lactic acid

Second – Tools/Ingredients to Use

3 Basics:

Running

Plyometrics

Weights



Third – It's Knowing How to Mix the Ingredients



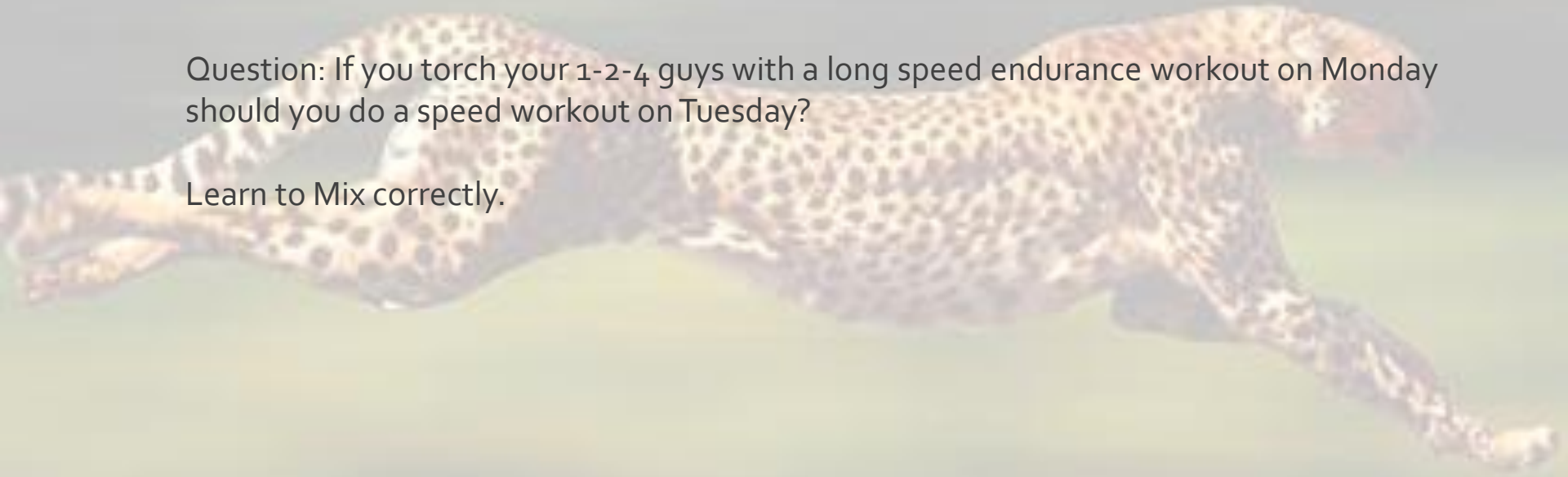
Training Hint

More IS NOT better - Train energy systems.

Ask yourself what is the workout targeting and why?

Question: If you torch your 1-2-4 guys with a long speed endurance workout on Monday should you do a speed workout on Tuesday?

Learn to Mix correctly.



Sample Workouts

Speed Work

8 x 30M hills – rest 5 min between each rep

Standing start 2x30-2x40-2x50-2x60 - rest 5 min between each rep

Block Starts. 3x20M – 3x30M – 3x40M 5-6 min rest between each start

Max velocity work. 7x30M Flying starts with 5 min rest between each.

Speed workout for mid season while speed endurance is being worked.

3x60M – rest 4-5 min between each

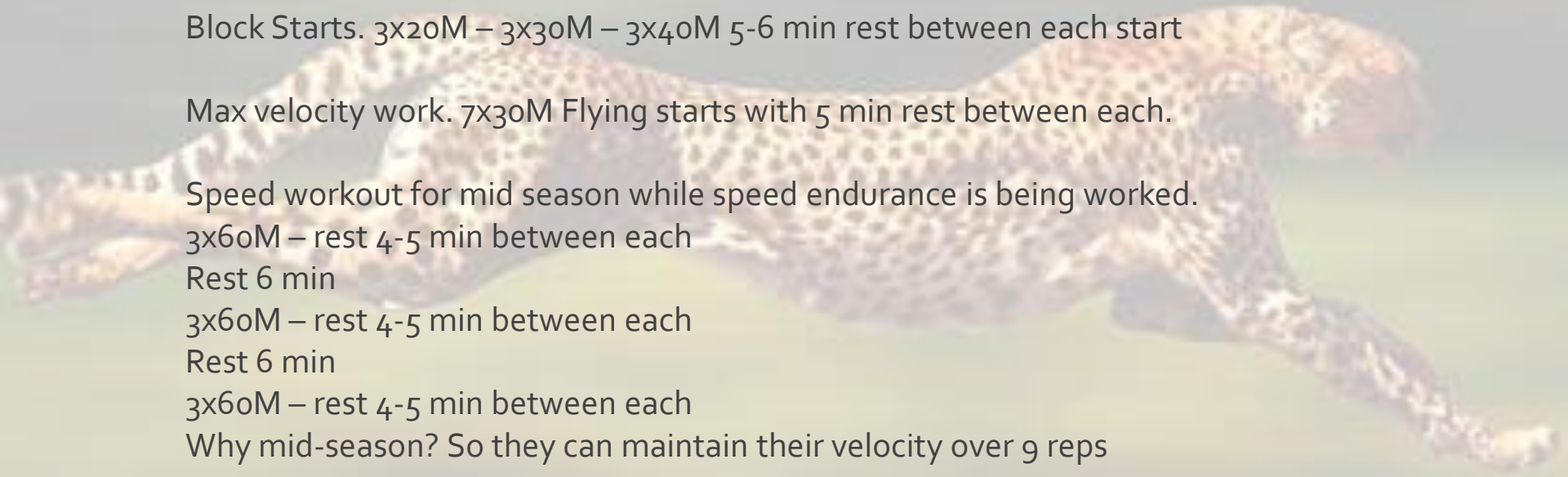
Rest 6 min

3x60M – rest 4-5 min between each

Rest 6 min

3x60M – rest 4-5 min between each

Why mid-season? So they can maintain their velocity over 9 reps



Sample Workouts

Speed Endurance

180M-150M-120M – rest 15 min between each rep

2x180M & 2x150M rest 8-10 min between each rep

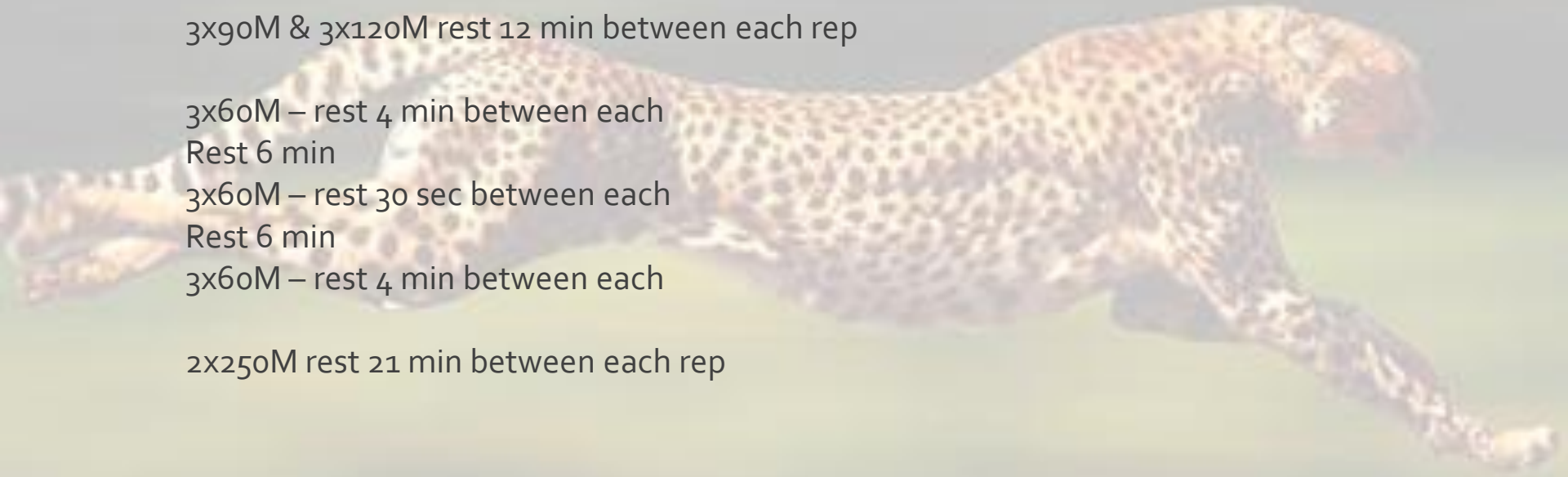
3x90M & 3x120M rest 12 min between each rep

3x60M – rest 4 min between each
Rest 6 min

3x60M – rest 30 sec between each
Rest 6 min

3x60M – rest 4 min between each

2x250M rest 21 min between each rep



Sample Workouts

Workouts

450M 90% target 400M time – rest 18 min then 3x150M rest 6 min between each rep. Each 150 rep should be at 90% of the target 400M or better. Note: Practice fast hands and not fighting the lactic build up on last 50M of the 450

3x(4x100's) run 100 walk 50 run 100 walk 50 etc. Rest 4-5 min between each set 75% of top end speed (CNS is engaged) – 1200M total

1x350M & 1x250M
90%+ of target time. 18 Min rest

400 the hard way. Run 100M walk back 50M Run 100M walk back 50M and so on. Until 1 full lap is completed. 90%+ of target time pace.

Recovery day – Tempo (65-70% top end)

3-4 laps. Run straight – jog 1st 50M of turn/walk 2nd 50M of turn - etc. Rest 2-3 min between each.

Pace

Train Fast be Fast Train slow be Slow. Always remember this. The 400 is a sprint. Toughness is a component but not *the* component.

Whatever pace you are training at you are locking in!!!! What are you achieving with each workout?



Sample HS& MS week

Note: Collegiate is different based on length of season and staging

MS & HS a balanced diet:

Monday – Speed (why? Because you can't do speed after blasting a workout the day before. You need to be fresh!!)

Tuesday – Tempo (why? Because you can't pop the nervous system after cooking the day before it needs 48 hrs recovery)

Wednesday – Extended Dynamic drills – no running

Thursday – Meet Day (Race modeling. 400M open, 4x400M, possibly 200M). 1000M of an average speed of 93% of top-end – Beautiful Speed Endurance day

Friday – Tempo (why? See Tuesday note)

If Meet is on Friday then

Monday – Speed (why? Because you can't do speed after blasting a workout the day before. You need to be fresh!!)

Tuesday – Light Tempo (why? Because you can't pop the nervous system after cooking the day before it needs 48 hrs recovery)

Wednesday – Speed Endurance (why? Rested and can go again but do not be greedy here with volume go for quality).

Thursday – Extended Dynamic drills – no running

Friday – Meet Day

Sample Training Week

For MS & HS

Note: Collegiate is different based on length of season, staging, and meet peaks

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Wednesday – Speed Endurance (why? Rested and can go again but do not be greedy here with volume go for quality you are 48 hrs from competition).

Thursday – Extended Dynamic drills – no running, no weights, no plyometrics

Friday – Meet Day