

DIFFERENCES IN TRAINING PROGRAMS FOR THE RUNNER AND THE SPINTER

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WHAT IS RUNNING???

- General population of runners with average minute per mile pace between 7 and 10 minutes

- 5K to half-marathons



TYPICAL DISTANCE PROGRAMS

- High school teams – average of 20-40 miles per week
- College teams – average of 40-70 miles per week
- Running club or higher level runners – up to 100 miles per week
- The theory being to build a strong base

HOW DO RUNNERS IMPROVE?

- The million dollar question!
- People have an inherent speed that they feel comfortable running at
- Running alone cannot make you stronger...



WHAT'S TRENDING FOR DISTANCE RUNNERS

- Weight training...
- High Intensity Interval Training – HIIT
- Uphill training



A GOOD COMBINATION

- Mixed strength training combined with endurance running may be more effective than circuit training in novice runners. (Taipale-2014)
- Strength training improved RE, performance and VO2 max
 - (Beattie – 2014)
- Improved Running Economy in competitive Masters runners (Piancentini – 2013)



HIGH INTENSITY INTERVAL TRAINING - HIIT

- People don't have the time to exercise!!!
- Usually performed at 90+% of VO2 max
 - Lasts a few seconds to a couple of minutes
- Last sets should be really taxing
- Decrease in glycogen which causes increase in lactate



NOT TO BE CONFUSED WITH STUPID HIGH INTENSITY INTERVAL TRAINING -- SHIIT*



*Mike Boyles

RUNNING HIIT PROGRAMS

Sanchez, 2013 Masters Thesis at EWU
3 days a week for 6 weeks

- | | |
|--|--|
| <ul style="list-style-type: none"> • High Intensity Interval Training <ul style="list-style-type: none"> • 10 Sixty second sprint intervals followed by 60 seconds of rest in between Exs (19 min) • VO2 max increased 12% • % Body Fat ↓, Body Mass ↓, Fat Free mass ↑ | <ul style="list-style-type: none"> • Continuous Endurance Training <ul style="list-style-type: none"> • 40-60 minutes of moderate intensity running • VO2 max increased 7% from baseline |
|--|--|

HIIT & RUNNING ECONOMY (RE)

- Barnes & Kilding -2015 – systematic review
- Some studies show that HIIT improved RE... and others used same parameters but did not show improvement
- One study trained at 94,106,132 % VO2 max
 - Only the 94 and 106% groups improved RE

ANOTHER THOUGHT...

- Decrease mileage and add power training
- Program may look like:
 - Run alternating days and lift for power 2-3 days a week with one rest day.

BENEFITS OF INTERVAL TRAINING

- Interval training commonly involves uphill running
- Very specific to running ...but mostly anecdotal evidence for improving performance
- No specific parameters
 - How long, how often, grade of hill, etc...



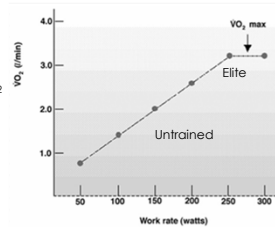
RESISTED AND ASSISTED RUNNING

- Resisted
 - Hill repeats
 - Non Motorized TM
 - 10-15% BW
 - May need 25-35% BW
 - (Andre et al ... 2013)
- Assisted
 - Downhill running with increased cadence



LACTATE THRESHOLD TRAINING

- Defined as the intensity at which lactate accumulation abruptly increases above baseline in the bloodstream
- Separates the "true" runners
 - The best runners train at 90+% of their VO_2 max (elite athletes are in the 70s)
 - Untrained work at 50-60% VO_2 max
 - (Gleason, 2015)
- How can you tell how you are training
 - Chatty Kathy – not close
 - Talk but don't want to – getting close
 - Can't talk – over LT



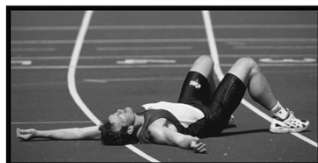
LACTATE THRESHOLD

- Studies do NOT support the idea that high intensity intervals improve LT better than moderate intensity work
 - (Gleason – 2015)
- Any mode of exercise will work but...

- Neuromuscular efficiency appears to be the key for specificity...
 - Drills
 - Reps
 - Time spent running

LACTATE THRESHOLD

- LT responds quickly to training (2-6 weeks) but not infinitely
- After 8 weeks of training you are usually maxed out and it doesn't get any higher.



SPRINTING

- Sprinters train for speed. (Anaerobic)
 - Power
 - Plyometrics
 - Assisted running
 - Resisted running

- 3 Phases: max speed quickly, acceleration, maintenance
- Starting in blocks takes longer to reach maximum velocity compared to flying start





POWER

- Power training has a speed component
- Power is the rate which work is done
- $\text{Power} = \text{work} / \text{time} = \text{Force} \times \text{Velocity}$
- Weight should be between 60-80% 1RM
 - 3 sets of 5 reps
- Should spend time on strength training before power – 2X BW squat (Haff-2012)



PLYOMETRICS

- To begin Plyos
 - 60% BW squat to 90° (Patel – 2014)
- High intensity shock plyo's
 - 1.5 to 2.5x BW squat (Patel – 2014)
- Can be minor and still have a positive effect
- Minimize ground time after eccentric load
- Improves running economy up to 5K - not marathon group (Lundstrom – 2015)



2 LEG AND SINGLE LEG EXS ARE NECESSARY



EZINNE OKPARAEBO'S INSANE JUMP



ASSISTED RUNNING

- Downhill runs
 - What is appropriate % decline
 - ↑ acceleration and max speed (Ittraju and Kumar – 2015)
- Higher speed on treadmills
 - What is appropriate speed?
 - Minimal increase in performance (Rumpf – 2015)
- Mechanical assistance
 - Bands
 - Pulleys
 - Partner

**Athlete at 20mph
(9.09 meters per second)
for 12 seconds**

RESISTED RUNNING

- Sleds – Best results seen for increasing power in 0-20m
 - (Rumpf – 2015)
- Incline – Lot of variability
- Stairs – No difference in 1 or 2 stairs at a time (Harris 2014)
- Chutes / Kites – goal is to reduce ground contact time



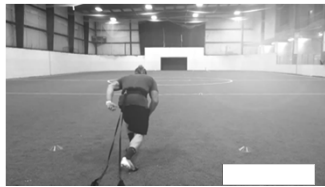
APPROPRIATE AMOUNT OF RESISTANCE

- Sleds
 - 10% of body weight
 - Harness at waist or shoulders
 - ↑ acceleration and max speed
 - (Ittraju and Kumar – 2015)
 - 20% BW for up to 30 yd acceleration
 - (Bachero-Mena -2014) (Cottle-2014)
 - Should cause > 10% decrease in sprint time (Rumpf – 2015)
- Inclines
 - 3-5% grade



APPROPRIATE AMOUNT OF RESISTANCE

- Stairs
- ??? Amount of carry over
- Chutes / Kites – 20 meter flying start
 - Primarily effective at near top speed
 - Does not effect front side mechanics - ↓ hip extension at take off and ↑ maximal hip flexion – high knee (Kratky – 2015)



WORK TO REST RATIO FOR SPRINTERS

- When performing power, max speed or plyometric exercises
- Need 1:5 to 1:10 work to rest ratio (Patel -2015)
- Need to be able to recover to provide max effort



SIMILARITIES OF RUNNER AND SPRINTER PROGRAMS

- Weight training
- High intensity – Power training
- Assisted and resisted training
- Importance of speed
 - ↑ stride length while maintaining stride frequency



IS THERE A MAGICAL FORMULA

- Bolger in 2015 did a systematic review of all resistance based training in sprinters
- Very limited – only 5 studies met criteria of actual competitive sprinters as subjects
- Not one specific form of resistance is superior
 - Whether some form of weight training or locomotor resistance
- Perhaps a blend depending on athlete's size, strength and experience will work the best
- So far ... Specific sprint training is most beneficial for decreasing sprint time (Rumpf – 2015)



CAN'T BEAT GENETICS!!!

- Power and Sprint performance is strongly influenced by genetics
 - (Eynon – 2013)
- ACTN3* XX genotype is more underrepresented in speed and power athletes (Kim – 2014)
 - Studied biographies of last 15 Olympic sprint champions & 20 fastest men in US history
 - Reached world class status in 3-7.5 years
- Lombardo – 2014
 - Tested the 10 year or 10,000 hour rule
 - Studied biographies of last 15 Olympic sprint champions & 20 fastest men in US history
 - Reached world class status in 3-7.5 years

Athlete	Sex	Olympic games	Events won	Years of DP to reach world class status?
Jesse Owens	M	1936	100 m, 200 m	4
Helen Stephens	F	1936	100 m	3
Wilma Rudolph	F	1960	100 m, 200 m	2
Bob Hayes	M	1964	100 m	2
Vivian Tyler	F	1964	100 m	7
		1968	100 m	
Tommie Smith	M	1968	200 m	3
Evelyn Ashford	F	1984	100 m	1
Florence Griffith Joyner	F	1988	100 m, 200 m	2
Carl Lewis	M	1984	100 m	Yes
		1988	200 m	Yes
			100 m ²	
Ben Johnson	M	1988	100 m ²	3
Gail Devers	F	1992	100 m	5
		1996	100 m	
Gwen Torrence	F	1992	200 m	7
Michael Johnson	M	1996	200 m	5
Marion Jones	F	2000	100 m ²	1
Usain Bolt	M	2008	100 m	4
		2012	200 m	

VERN GAMBETTA



THANK YOU!

