

**THE AGING
ATHELETE:
TRAINING AND RACING ENDURANCE
EVENTS**

FREDRIC SILVERBLATT, MD
PROFESSOR OF MEDICINE
ALPERT SCHOOL OF MEDICINE OF BROWN
UNIVERSITY

ROME
REGIONAL INTERDISCIPLINARY
MEDICAL EDUCATION

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Conflict of Interest Disclosure

I have no conflicts and nothing to disclose

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- So at the age of 75 I decided to do an ironman

Not just any ironman but...

IRONMAN WORLD CHAMPIONSHIP
OCTOBER 21, 2013
KONA, HI

What is an Ironman?

- SWIM 2.4 MILES
- BIKE 112 MILES
- RUN 26.2 MILES
- FINISH BEFORE 17 HRS.

IRONMAN WORLD CHAMPIONSHIP

- Held on the Kona Coast on the "big Island" in Hawaii, a volcanic outcrop in the Pacific.
- Lava rocks absorb and radiate the equatorial sun producing 90+ degree temps during the race
- Trade Winds up to 30 MPH
- 2000 athletes from 60 countries.
- 100,000 compete for slots.
- My age group (75-79): 15 athletes, from Germany, Japan, New Zealand, USA, Great Britain and Canada



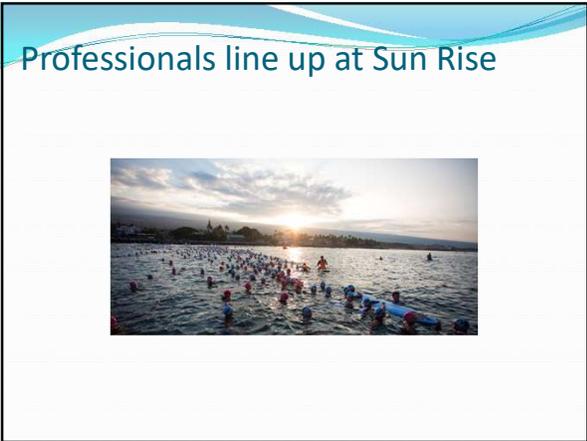
What was I thinking?

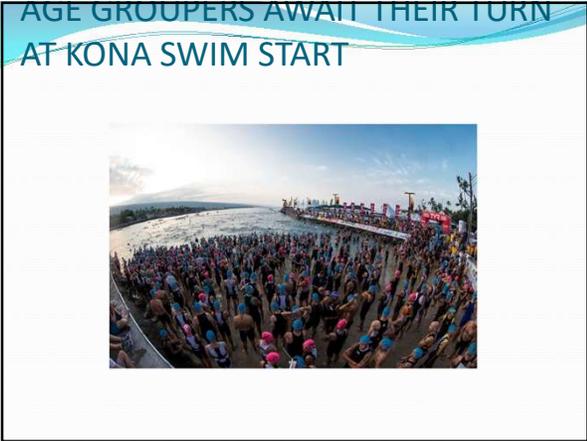
I hope I look like that when I grow up

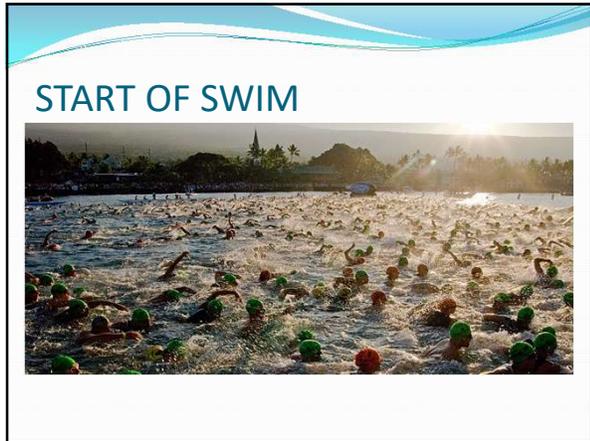
WHAT HAPPENS TO ENDURANCE AS WE AGE

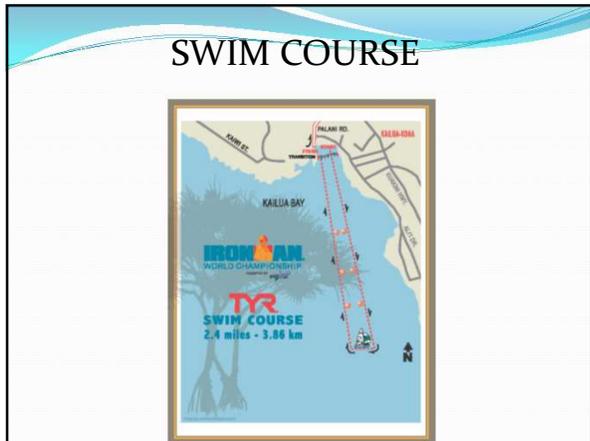
- Aerobic capacity (VO_{2max}) declines
- Maximal heart rate is reduced, reducing stroke volume
- Muscle fibers are lost
- Production of anabolic steroids decreases
- We get fatter.





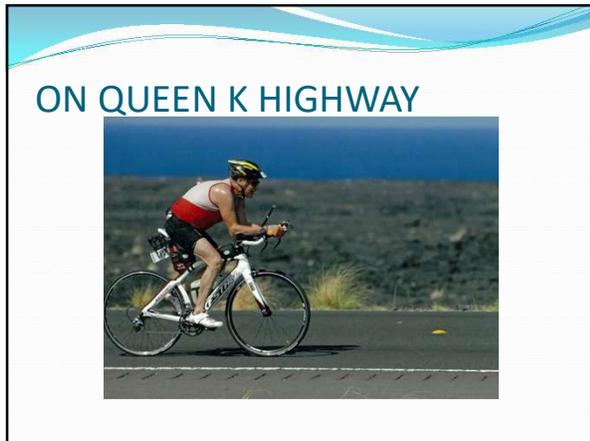












Challenges of Kona

- 15 hours of exhaustive exercise
- Head winds and side winds gusting to 50 MPH
- Average temperatures – 92- 104 degrees
- Hilly terrain.

REFUELING ON THE BIKE



AID STATION



HOW DID I TRAIN

- A quick tour of exercise physiology 101

Physiologic Predictors of Endurance

- 1. Aerobic Capacity
- 2. Lactate Threshold
- 3. Economy

Aerobic Capacity

- A Measure of how much oxygen you use when exercising at a sustained maximal workload
- One of the best predictors of endurance performance
- VO_{2max} = ml of oxygen/kg/min
- Can be measured in the lab
- Rough estimate = $15(HR_{max}/HR_{rest})$
- VO_{2max} *potential* is largely genetic
- Decreases with age but can be increased by *aerobic-capacity workouts*.

TABLE 3.2. Aging and VO_{2max} in Fit Male Cyclists

AGE GROUP	VO_{2MAX} (AVERAGE)	% CHANGE
20-29	69.5	—
30-39	64.2	-7.6
40-49	65.0	+1.2
50-59	62.7	-3.5
60-69	43.6	-30.5
70-79	36.8	-15.6

Source: F. B. Wyatt and J. P. McCarthy, "Ventilatory Parameters Influence the Decline in VO_{2max} with Age in Fit Male Cyclists," presented at the 4th American Society of Exercise Physiologists Annual Meeting, June 2001.

Lactic Threshold

- The point during intense workouts when you experience the onset of rapid breathing, when you begin to feel that the effort is unsustainable.
- Due to rapid increase of lactate in the blood – (actually accumulation of hydrogen ions).
- Can measure lactate accumulation in the lab
- Training at the lactic threshold level helps the athlete become less sensitive to the negative effects.

Economy

- How efficiently you use oxygen while exercising.
- Partially genetic, e.g. Michael Phelps is tall with long legs, big feet and hands.
- But there are things that are under your control such as:
 - Improving technique thin how much more oxygen an inexperienced swimmers uses floundering in the water as compared to the smooth stroke of Katie Ledecky
 - Losing fat,
 - using lighter equipment

Variables in Training

- There are only 3 workout variables that can be changed in training:
 - Duration: how long each workout takes
 - Frequency: how many workouts you do in a given time, e.g., three times a week or every day.
 - Intensity: how hard the work out is, as measured by a rating of perceived exertion, heart rate, pace or power.

INTENSITY

- By far the variable that has the biggest impact on performance is intensity – more for shorter races (e.g., 5k's or Olympic distances triathlons, less for longer races (e.g., marathon or Ironman).
- If you train slower you are more likely to lose performance than if you train fast.
- But too much speed can lead to injury and long slow distance workouts (LSD) can lead to mental breakdown caused by tedious training
- So a mixture of moderate effort workouts with interspersed speed work is optimal.

High Intensity Training (HIT)

- Studies have shown that the expected decline in age related performance can be stopped or even reversed by consistent application through the decades of high intensity training.
- This generally means inserting an interval session once or twice a week into your training.

INTERVAL TRAINING

- For example a starting routine might be:
 - Warm up for 10-30 minutes
 - Do 3 x 3 minutes intervals at lactate threshold (when your breathing rate increases) and do 1 minute of easy recovery between each interval.
 - Measure your intensity by pace, heart rate, power or perceived effort.
 - Cool down with 5 minutes of easy effort.
 - Repeat the workout over the following weeks until you measure improvement e.g., going faster with the same effort. Then increase the number of repeats the following week

Caveats

- When performing interval training the absolute intensity, duration of the interval and recovery period and number of repetitions should be only slightly more challenging than your current capacity for physical stress.
- Stop the repetitions when you feel that you could do only one more.
- Consult the literature on your particular sport for specific interval workouts.

Screen shot of a hill climb interval



STRENGTH TRAINING: USE IT OR LOOSE IT

- The loss of fitness as we age depends upon muscles.
- Weight training can maintain, restore and improve muscle strength even in the elderly.
- Focus on sport-specific muscle groups
- Don't forget about your core!
- Weight training for endurance sports does not mean building big bulging muscles

SLOW TWITCH OR FAST TWITCH

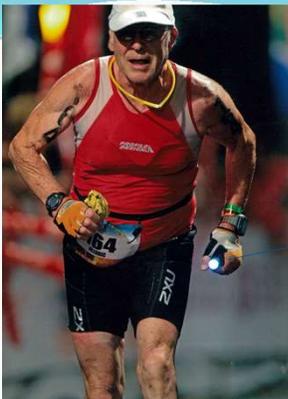
- Type I fibers or “slow twitch fibers” are less powerful but able to repeat contractions many times before fatiguing. Common in the muscles of endurance athletes
- Type II fibers or “fast twitch” are powerful but fatigue more quickly – think Husain Bolt.
- Some type II fibers can take on endurance qualities of type I – more power and endurance!
- Weight training and HIT workouts promote this.

RUN COURSE



ON THE RUN





- HEADING TO THE FINISH! NOT MUCH LEFT.

FLASH LIGHT

C
Crowd waiting at the finish line



ALMOST THERE! WHERE DID I GET THAT ENERGY?



I AM AN IRONMAN!



ON THE PODIUM!



My best reward!