

## **East African Distance Runners: What Makes Them So Good?**

On Saturday I attended one of the most thought provoking running conferences in many years. See below for my rough notes on the presentations, please forgive them being a bit piecemeal but I'm just trying to cover the main points, flag up some issues and perhaps start some debate and discussion:

In collaboration with The 2014 Legacy Programme and the Great Scottish Run, Biomedical Scientist Dr Yannis Pitsiladis presented a seminar on East African Running. East African running is all about endurance running, (as opposed to West African roots which is all about sprinting). Of the world's 25 fastest men at 5k – 24 are African, at 10k out of 25 it's 19 and at the Marathon it's 25 out of 25! There is so much to learn about why this is the case.

Dr Yannis Pitsiladis, is a specialist research scientist based at Glasgow University, studying East African athletes. He works along with the top runners (including Kenenisa Bekele, Haile Gebrselassie) and coaches looking at genetics, training, as well as lifestyle and way of life in Africa.

It's not even really an Ethiopian or Kenyan phenomena, it's all based in two small areas of Ethiopia, the high mountains either side of the rift valley, and again in Kenya, high above the rift valley. There is even one school in Ethiopia which has produced 7 or 8 Olympic/world champions. 80% of their elite athletes come from this area. Why is this the case?

It is a harsh way of life, no shoes, mud huts, no electricity, basic food etc, how does this produce world champion athletes?

Dr Pitsiladis has spent much time taking genetic samples, and carrying out tests on the elite Ethiopian runners and general population to try and find links.

After taking samples from all the elite African runners they could track down, their analysis shows no obvious genetic advantage to being East African, they all have a very different and diverse make up. Genes are obviously important, if you want to be an elite athlete it pays to select your parents very carefully, but there is nothing that can be identified as East African. The focus then turned to the East African way of life. He believes we are not facing a biological phenomenon, there is currently no evidence of a modified gene pool putting endurance running beyond Caucasians. East African endurance domination is down to social and economic factors.

How then do they explain the number of top runners? They looked at how kids go to school:- As children, 68% of all top Ethiopian/Kenyan runners ran back and forward to school, from the age of 5 onwards. (this is distinct from those who walked to school). They tested school kids who had no formal running training and found that their VO<sub>2</sub>max results were better than many UK athletes!

Diet: Their diet is based on maize, rice, potatoes, vegetables, small amount of meat. Which exactly mirrors what science has decided is an almost textbook diet!

They eat their meals immediately after training, again the perfect time to get the carbs back into the system and build up for the next workout.

Interestingly, they actually under eat by 9% per day as compared to what would be recommended.

They don't drink as much as scientists would expect them to, very little during their long training runs. During a marathon perhaps picking up a water bottle three times with one or two gulps each time. They can lose 10% of their body weight during a marathon. (More on drinking water later on which is very significant).

Economic factors are important, they can win enough money in one minor race to be rich, perhaps the equivalent of 10 years wages of the average Ethiopian. It's a way out of poverty and a passport to rich and prosperous life. This fosters an attitude for hard work and mental toughness.

Culture and role models: when there are so many top runners and role models, kids grow up wanting to copy them, they want to be runners, it is just accepted that they can do it, they can be good enough.

Geography: The relatively small areas producing the runners are all at altitude, the towns are at 2400m to 2800m. Much of the athlete's endurance training is carried out at higher altitude than this, i.e. over 3,000m (pushing 10,000 feet above sea level!). Their training covers aerobic workouts, intervals, cross country and is based on variable running i.e. very little steady state workouts.

Professor Timothy D Noakes, MBChB, MD, DSc, FACSM -

Has been researching the anthropological angle to understand why man evolved from apes to humans, biological advantages caused us to evolve to cope and survive. This is significant for running in terms of eating and drinking. Look at what we were designed to do, and this is how we should treat our bodies. Humans evolved over millions of years for endurance exercise, to chase down and produce heat paralysis in animals. That needs a bit of explanation – part of the reason humans adapted to be the dominant animal was the ability to keep going in the heat of the day, dissipating heat and keeping core temperature down. Other animals can not do this efficiently and therefore man had the advantage in tracking down and hunting. He had some video of this actually still happening, where a couple of Africans head out on the plains to hunt an antelope. The antelope sprints away, but they just keep on a slow steady pace after it. This lasts for 4 hours at which point the core temperature of the antelope has hit the 41.5 degrees to induce hypothermic paralysis and the hunters walk up to it and have their evening meal! Obviously the hunters don't know too much about the science to explain what happened, it's just the way it works to them. He also showed the same thing in a national park where the keepers wanted to capture a cheetah, they chased it in vehicles (for obvious reasons!) until its temperature had obviously hit 41.5 when it keeled over. They walked over, tied its legs and stuck it in a cage did what ever tests they wanted and then let it go. Saves using tranquilizers! During this hunting/gathering, there would not be much water available, so the body adapted to delayed fluid deficit replacement until evening meal. Body adapts to sodium conservation in the heat. In tests, the more sodium you give athletes, the more they lose! Due to a late call off, Tim Noakes then had time to present a second session, this time on Why the top Africans do not slow down and indeed usually speed up at the end of races. African runners also tend to be able to run fast and hold that pace for longer, i.e. hold  $Vo_{2max}$  for longer

Looking at world championship/Olympic 10k races, athletes speed up in the last km/mile. Noakes points out this is against traditional idea of  $Vo_{2max}$  and lactic acid build up which indicates you get more and more tired until you are exhausted. He believes not enough research has been looking at the athlete's brain! The feed forward and feedback control of the brain he sees as very important to allow recruitment of more muscle and

physiology factors. African runners feet tend to only be in contact with the ground for very brief periods of time (a few of you may have heard me going on about that after watching them at Holyrood – they don't splash in puddles!!!) this means pre-activation is crucial as great power has to be exerted in that brief timescale.

Looking at their training sessions. There is a great deal of variability in each session. Even long runs have bursts and pace segments. The scientific experiments involved monitoring individual muscle action on elite athletes and they conclude that preactivation of muscles was important (difficult to work on as it's part of the subconscious part of your brain!). Evidence seemed to show that the ability to vary things prevents you feeling tired. Running at a steady pace, muscles lose a bit of their pre-activation during a run. Varying it, keeps pre-activation working better.

Africans are particularly good in hot conditions. At least partly due to their lighter weight (average 53kg against European 63kg), as every kg means that you create more heat when running.

Tim Noakes also pointed out they had analysed Paula's Athens disaster and calculated that was more than likely the same issue. Taking the ambient temperature of 35 degrees, and Paula's weight 53kg, they calculated the heat she was producing and the limited amount that could be dissipated at that air temperature, at the time she stopped, they estimate her core temperature would have been 41-41.5 degrees! The winner in Athens only weighed 43kg and therefore created much less heat and had less heat to dissipate. Really interesting to consider this with the stories about heat paralysis in animals at 41.5degrees and Paula afterwards stating that she felt she was getting to the stage that she just couldn't move.

To emphasize the importance of mental barriers, (I can't remember the individual athletes involved), we were shown a picture of the African winner and non African runner up (by 2 seconds) in a world championship 10k, just after the finish in their celebration lap. He pointed out neither looked distressed. The second placed runner hadn't 'died' or collapsed, so hadn't pushed himself to his limits. So why not? If you are two seconds from a world title what stops you pushing yourself to your limits?

Tolasa Kotu – Ethiopian Head Coach

Gave a talk on training and coaching in Ethiopia. He has coached, Gebrselassie, Bekele, Dibaba, Defar etc. and gave a good insight into their training and lifestyles.

They live at altitude and train higher! They do go low to do interval training as much of that is impossible at these altitudes, but most endurance work is done about 3000m. try to alternate hard and easy days (it's all relative!), although can have trouble getting athletes to have easy days as up and coming runners are looking for fast-tracking to race prize money and haven't realised the importance of easy days. Cycles tend to be 3 months, 3 months 1 month, then peak for championships.

They have high intensity training, not necessarily higher mileage. The top runners tend not to run with the others from the training camps but tend to want to work, and to work harder, on their own.

He did point out their success is in spite of many problems – only one running track in Ethiopia, shortage of training facilities, shortage of coaches, no rehabilitation facilities,

difficulty keeping top runners together.

Last major topic which came up in the question session and fairly dominated that, was the issue of drinking (water!). If you have not heard of hyponatremia, look it up, it's fairly important! Tim Noakes next book is looking at water-intoxication and considers it a scandal the way the sports drinks companies have marketed their products and are contributing to deaths during races. Drinking too much water can kill you, not drinking enough and getting dehydrated won't! Any deaths during races (related to drinking water), all relate to drinking too much. He has documented 12 deaths and 1700 hospitalisations due to this. His studies show that water intoxication is due to fluid overload not sodium loss. He has carried out experiments giving runners sodium and they just lose more! The runners adapt to fluid loss see earlier comments on how much African athletes drink in training/racing. Also in example of spending 4 hours in the heat chasing an antelope, the hunters had 1 litre of water between them. The body is designed to go into dehydration then recover. The main advice is to not anticipate thirst but drink to your thirst. He is finding it almost impossible to get his evidence published, due to the power and influence of the big sports drinks companies.

Incidentally, women are slightly more at risk from hyponatremia. Also, don't take anti-inflammatory before races, they increase the risk of hyponatremia as well!

These have been fairly brief notes (honest) and are not very structured, as they are quite simply notes from the sessions. They just attempt to summarise/highlight the topics and issues. If anyone has any questions or would like to discuss any of the issues, stick it on the comments or send me an e-mail.

PS next time I'm left on my own taking the Meadows session.....watch out for the antelope ;-)

Garry