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“Running Gait Analysis – a minimalist approach.”



Presented by: Mark Green - BPhy

Will commence LIVE from Sydney, Australia at 7:30pm AEST

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Andrew Ellis
BSc (Ex. Sci), M. Phyt

- World Health Webinars CEO
- World Health Webinars (Australia/NZ) Host

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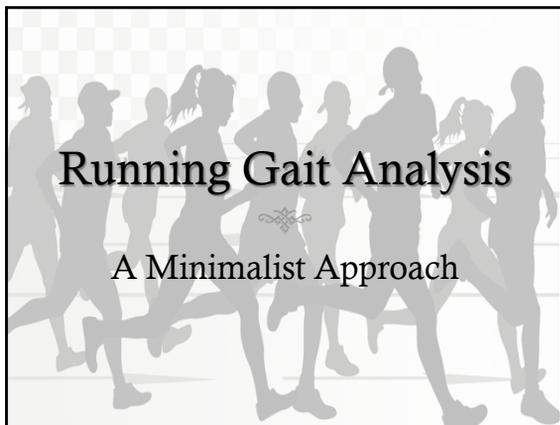
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Mark Green




- Partner 'The Body Mechanic'
- Specialty developed through an active interest in endurance events.
- Certified POSE running coach
- Worked extensively in the UK with one of the world's leading running technique coaches
- Ranked 6th Place in 2013 - The North Face 100, (100km trail run, Blue Mountains Australia)



Who Am I?

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- Runner for 30 years**
 - Represented NZ at Mountain Running World Championships
 - Competed in two Ironman Triathlons (PB: 9:12)
 - Competed in numerous marathons (PB: 2:33)
 - Competed in 100km Ultra Marathon in Blue Mountains in 2013
- Injuries**
 - 7 broken ankles (2 surgeries)
 - Knee arthroscopy for medial meniscus tear
 - Ruptured medial head of gastroc
- Physiotherapist for 16 years**
 - Graduated from University of Otago in 1996 with Bphys
- POSE Running Coach - 2008**
- Vivo Barefoot Running Coach - 2010**
- Work at The Body Mechanic in Sydney**
 - Clinic which specializes in the treatment and rehabilitation of runners cyclists and triathletes



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Why Change?

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- According to recent research up to **79.3%** of runners will stop running due to injury
Incidences and determinants of lower extremity running injuries in long distance runners: a systematic review (2010). R N van Gent, D Stam, M van Middelkoop, A G van Die, S M A Bierma-Zeinstra, B W Koes; British Journal of Sports Medicine
- It would appear from the latest research from Harvard University that it is poor technique which is injuring runners.
- "Heel strikers are 2.6 times more likely to have a severe running injury than forefoot strikers"
"Foot Strike and Injury Rates in Endurance Runners: A Retrospective Study" Adam J Daoud, Gary J Geisker, Frank Wang, Jason Suresky, Yahya A Daoud, Daniel E Lieberman; Medicine and Science in Sports and Exercise (2012)

NB: If someone is running consistently to the level (volume and performance) they are happy with AND they are not getting any injuries - there is a very good argument not to change anything at all.

"If it's not broken - don't fix it!"

Technique Related Injuries

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- Poor running technique can have a significant contributing influence in the following commonly seen running injuries
 - Hamstring Origin Tendonopathy
 - ITB Friction Syndrome
 - Patella-Femoral Dysfunction
 - Patella Tendonopathy
 - Fat Pad Inflammation
 - Shin Splints
 - Achilles Tendonitis
 - Plantar Fasciitis





Three Fundamental Elements to good running technique

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- Posture
- Rhythm (Cadence)
- Relaxation

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Posture

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- 50 – 60 Years in our modern “unnatural” habitat
 - Not enough sunlight
 - Poor quality food
 - Lack of sleep
 - TOO MUCH SITTING

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Natural Squat Vs Unnatural Squat

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Full Squat Western Squat

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Poor Posture



- Ⓢ Flexed at hips
- Ⓢ Foot landing in front of Centre of Mass
- Ⓢ Long Stride length

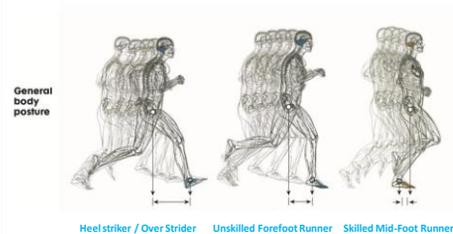


Good Posture



- Ⓢ Upright Posture
- Ⓢ Foot landing close to under Centre of Mass
- Ⓢ Shorter Stride Length

Posture Comparison



General
body
posture

Heel striker / Over Strider Unskilled Forefoot Runner Skilled Mid-Foot Runner

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How To Change It



- ⌚ Most people will need a metronome set to beep at 180bpm.
- ⌚ All they have to do is fall into time with the beeps.
- ⌚ Frequent training sessions will help them to develop a new motor-neural pattern where 180 becomes the norm

Relaxation



- ⌚ Arguably the hardest skill to master – especially if you are concentrating on other aspects of your technique, such as improving your posture and increasing your cadence.
- ⌚ Important points:
 - The foot should be relaxed on landing.
 - People who are advised to “run on their forefoot” typically plantarflex the ankle before landing which drops the forefoot and causes an excessive increase in load on the metatarsals, calf and achilles
 - Angle of elbows should be close to 90 degrees, to help conserve energy and reduce trunk rotation
 - Shoulders should be down and relaxed
 - Use Usain Bolt as an example – watch him in slow motion and you will see his jaw is very relaxed and his shoulders are down and away from his ears

Relaxed Running Technique



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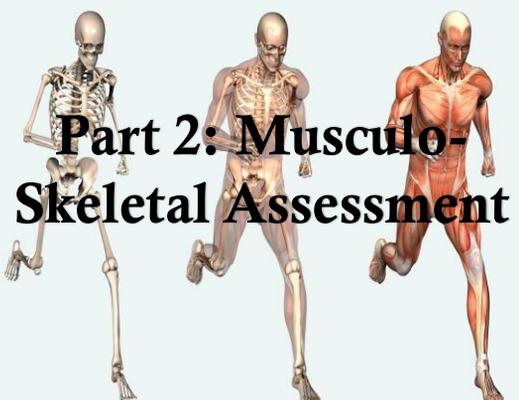
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London Olympic Marathon Silver Medalist



We carry out specific musculoskeletal screening process to look for any obvious asymmetries or range-of-movement deficits.



⦿ Points of particular importance:

1. Ankle Dorsiflexion Range of Motion

- A reduction of ankle dorsiflexion due to either previous injury, or tight gastroc/soleus can make the transition process more difficult

2. 1st MTP Joint Range of Movement

3. Morton's Foot

- Short first metatarsal relative to the second metatarsal
- Results in increased loading through the 2nd,5th metatarsals

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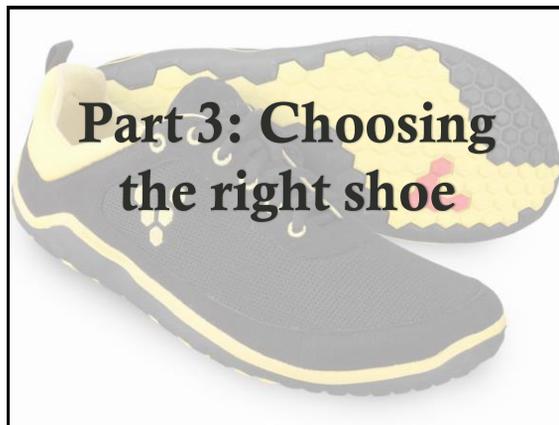
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Part 3: Choosing the right shoe



Choosing the right shoe



- ⦿ There has been an enormous increase in the number and type of minimalist shoes readily available over the past few years.
- ⦿ Previously called "racing flats" they were largely the domain of elite runners
- ⦿ Now there is a shoe to suit almost everyone.

The important features in shoes to be aware of:

- ⦿ *Pitch* – the relative difference in the height of the footbed from rear to front (normally measured in mm's)
- ⦿ *Footbed* – these vary significantly in thickness and density
- ⦿ *Flexibility* – different manufacturers include different features in the footbed to stiffen or soften the shoe
- ⦿ *Weight* – most shoes now are lighter than they used to be due to the evolution of new construction materials

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Matching a person to a shoe

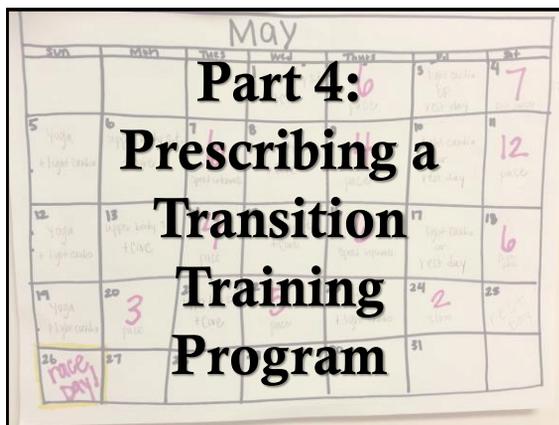


- ④ Most importantly - the type of shoe chosen should match the persons running technique.
- ④ The typical running shoe shop and medical professional role is to look at a persons technique and give them an appropriate shoe for that technique
 - For example – a cushioned, control shoe for someone with a long stride, heel strike and who over-pronates
- ④ Our approach is to look at a persons technique, help them to improve it, then suggest a shoe which will compliment their “new” technique.

What about day shoes?



- ④ The forces involved in walking are significantly less than running
 - Ground force reaction walking = approx. 1 * bodyweight
 - Ground force reaction running = approx. 2 – 2.5 * bodyweight
- ④ This means it is possible to adapt more quickly to a lower, lighter, “barefoot shoe” for work and/or normal ADLs.
- ④ This has the added advantage of strengthening intrinsic foot muscles, improving posture, improving proprioception and ultimately helping the foot adapt to running in a more efficient shoe.



Too Much Too Soon



- ④ In my experience – the single biggest factor which causes injuries is doing too much too soon.
- ④ Even perfect running technique puts the body under load. If you run more than the tissues of your body can cope with, and you do it repetitively – something will break down.
- ④ Most negative press associated with minimalist running relates to calf muscle injuries, achilles tendonitis and metatarsal stress fractures.
- ④ These are almost always associated with poor application of technique and/or running more than these structures can cope with.

Prescribing a specific transition program is VITAL to the success of the assessment process.



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Little and Often



- ④ Our transition training schedules are based around the philosophy of ‘little and often’
- ④ A persons body will cope best if they apply a load (in this case running) frequently, and in small doses.
- ④ To put it in easily understandable numbers, as an example let’s use a runner training for a marathon who wants to run 40km per week
 - The hardest way for him/her to cope with 40km per week of training would be to do it all in one session
 - i.e. Run 40km, then rest for a week because everything hurts
 - A much easier way for their body to cope might be running to-and-from work every day (in this case 4km) and having the weekends off
 - i.e. Running 10 * 4km per week.



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Summary



• An effective running assessment needs to include:

- Analysis of Running Technique
- Running Specific Biomechanical Screening
- Advice on appropriate footwear
- Specific Transition Training Plan

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Live Q & A With Mark Green



SPECIAL thanks!



World Health Webinars Program
Coordinator
14th March – 24th July 2013
Margaret Banff



**“The Unstable Pelvis
and Running Injuries”**

Introducing



World Health Webinars Program
Coordinator 1st August -
Jenny McConnell



“The Problem Shoulder”

Coming up next World Health Webinars

1st August
“Diagnostic Ultrasound Imaging for shoulder problems”

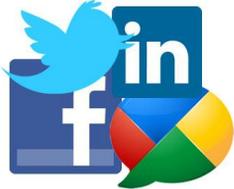



with Dr Lisa Briggs

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Live Q & A
 With Mark Green



Thank you
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