

# Why do runners get injured and how do we stop it?

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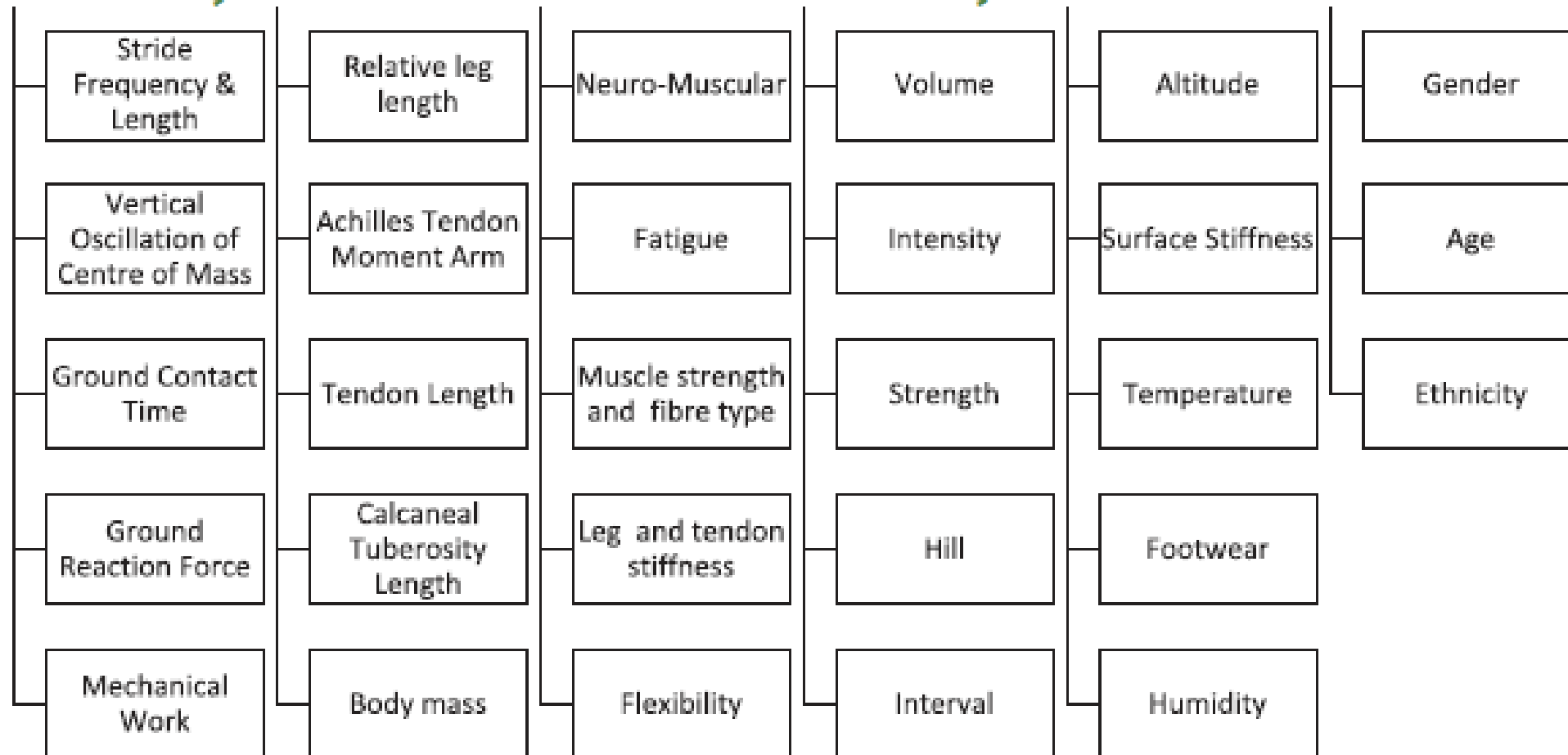
Wednesday April 3<sup>rd</sup>, 2019



SPORTS PERFORMANCE



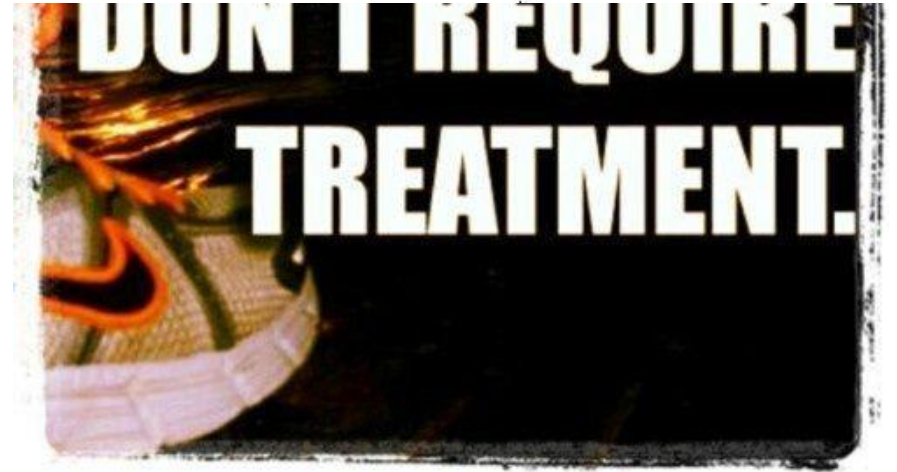
# Are changes in running economy associated with changes in performance in runners? A systematic review and meta-analysis



# Are you a runaholic?

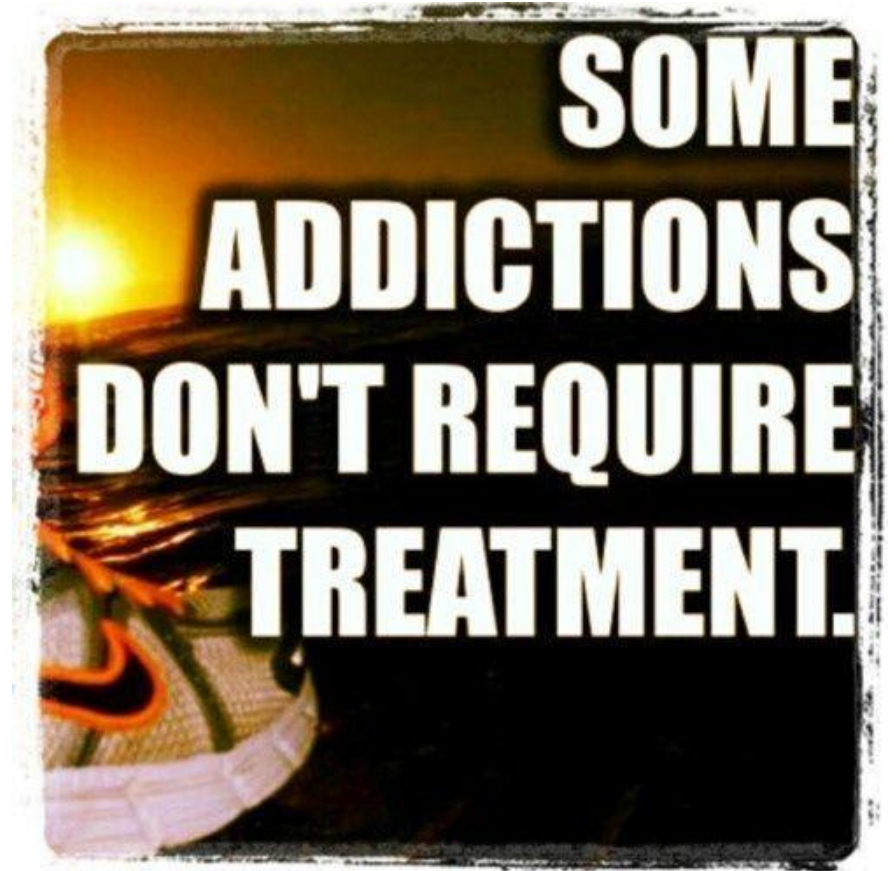
## Findings:

There is marked diffuse thickening of the calcaneal insertion of the medial bundle of the plantar fascia, this measures over 8 mm in thickness (normal less than 4 mm). The involved fascia is diffusely heterogeneous, with interstitial bone marrow oedema is present within the adjacent calcaneum. A 1.2 cm long tear noted. No fascial retraction seen.

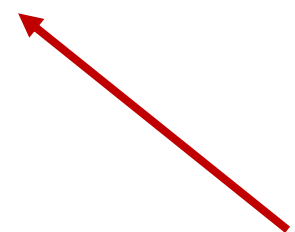
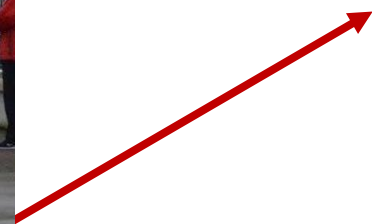
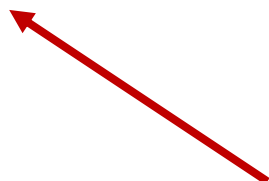


# Introductions...

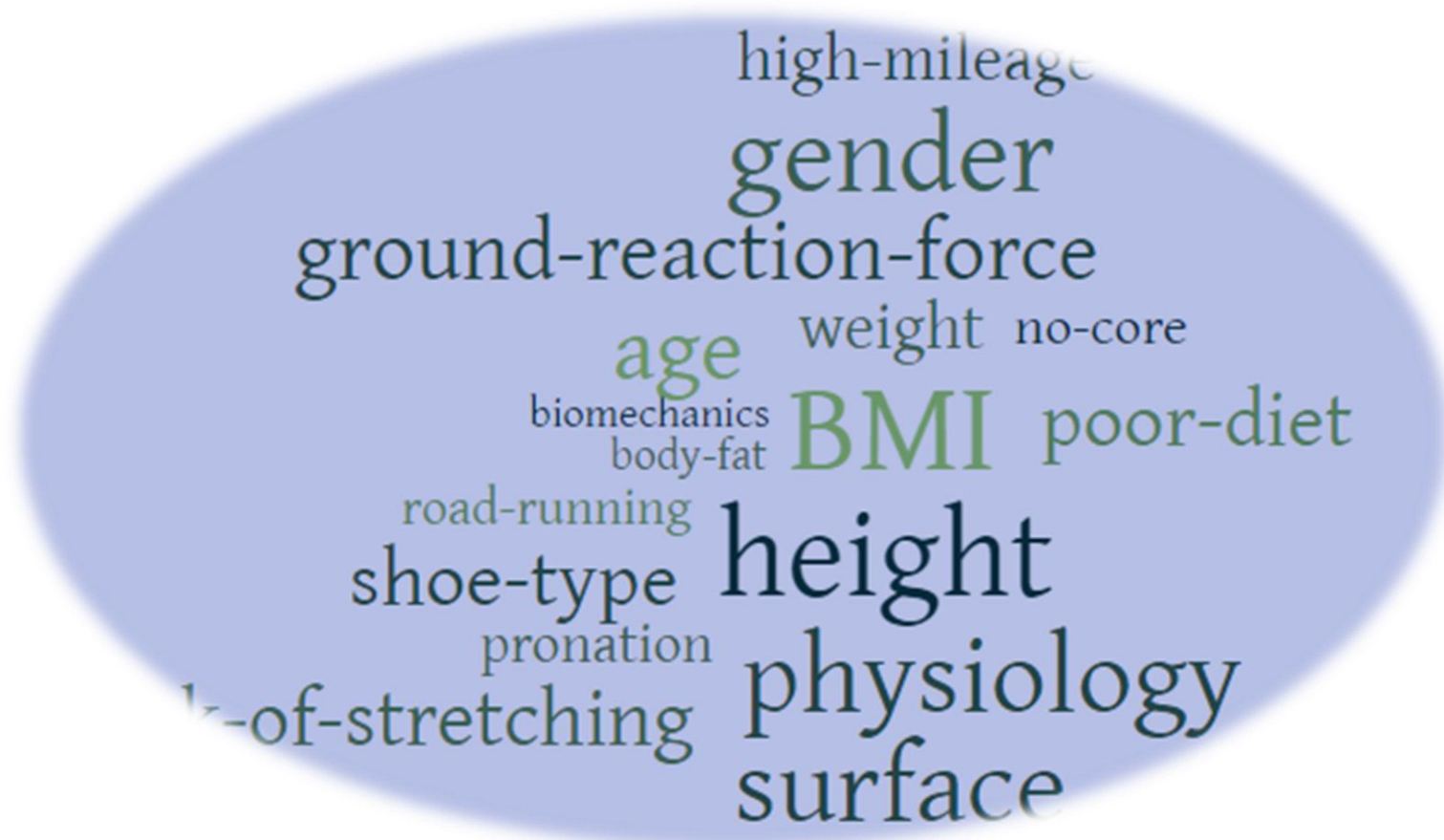
- My name is Peter.
- I'm a runaholic.
- After 10 years of trying.....I've run every week for 147 of the last 155 weeks.



# My Background



# Section 1: What is the biggest predictor of running injury?

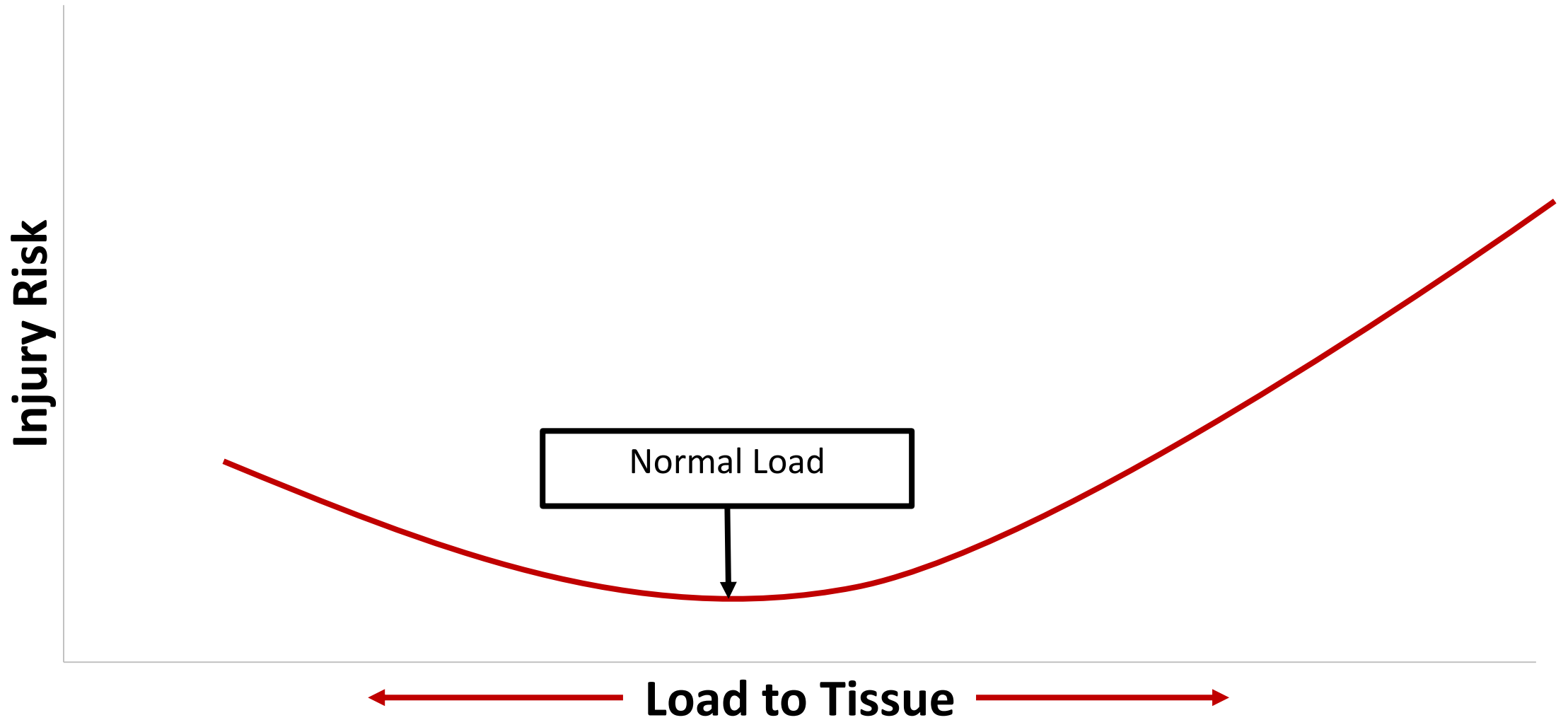


# 1. Load is the biggest predictor of injury..

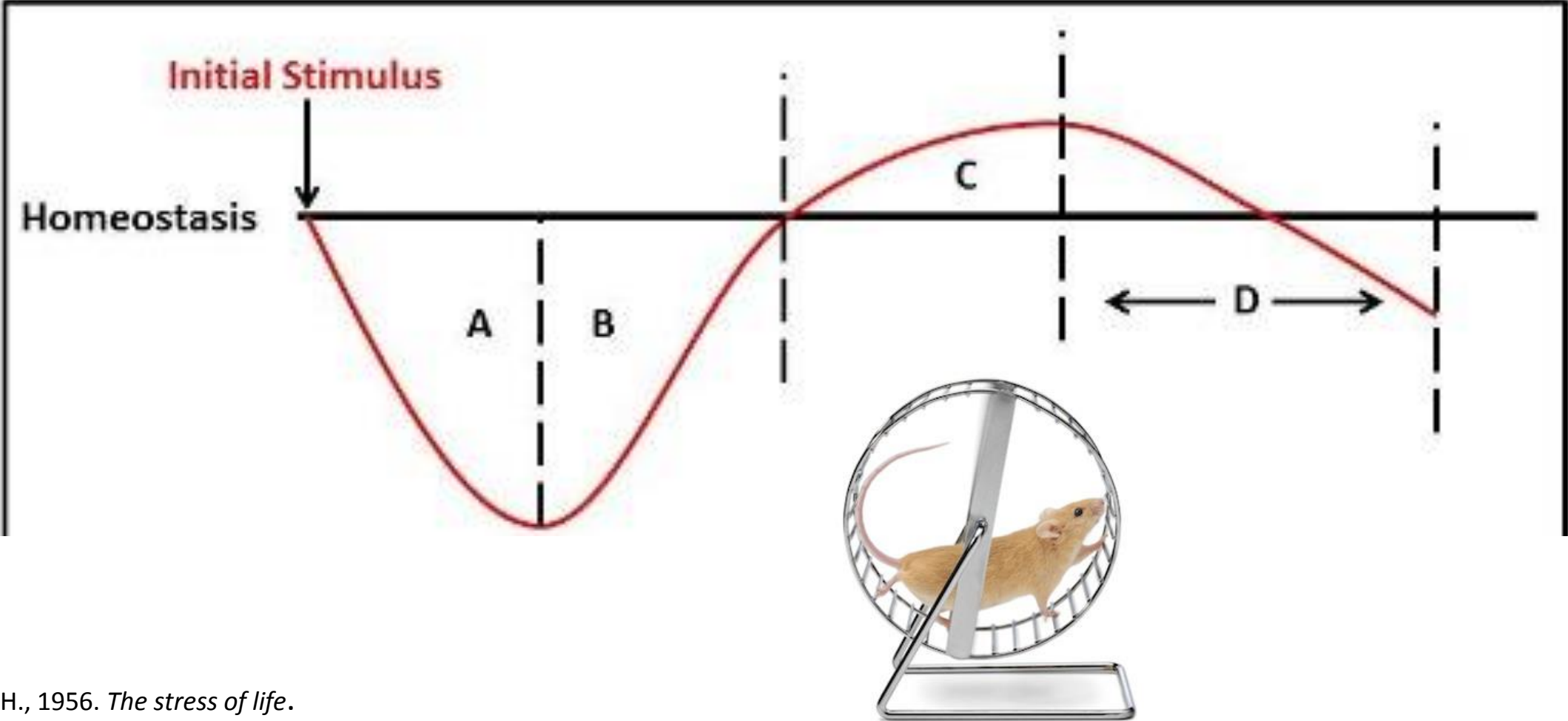


(James 1978; Vleck & Garbutt; 1998; Van Gent et al. 2007)

# Load is the biggest predictor of injury...



# The General Adaptation Syndrome



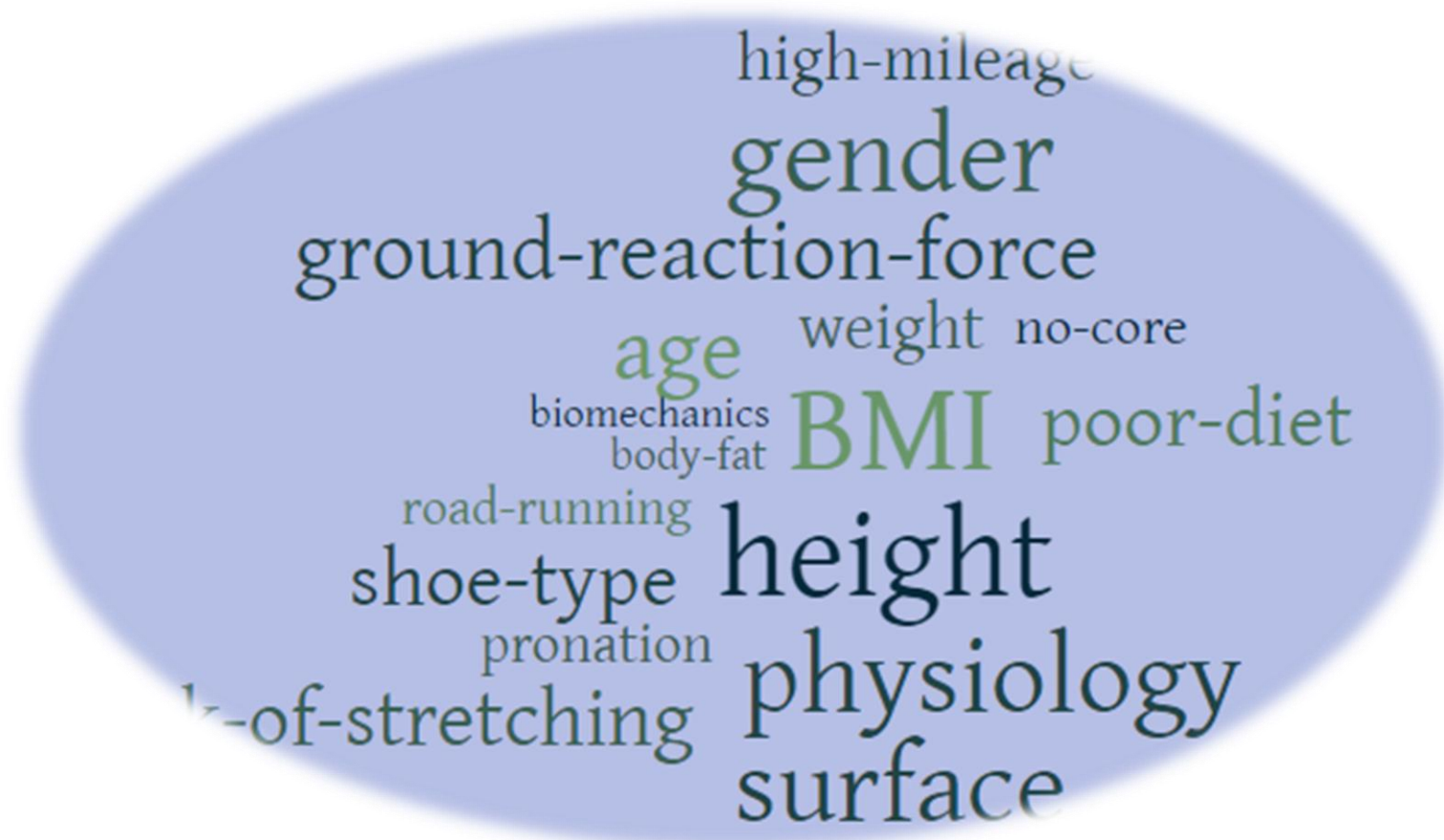
Selye, H., 1956. *The stress of life*.

# Why do we change our load too quickly?



*A requirement for **subtle decision making** with very little **cues or feedback**, combined with an **emotional decision maker** – make for a very bad combination.*

# Section 1: What is the 2<sup>nd</sup> biggest predictor of running injury?



## 2. Previous injury is the next biggest predictor



### Section 1 Take Home Messages

1. Load is the biggest predictor of injury.
2. Avoid sudden changes in load.
3. Don't get injured.
4. Don't be at increased risk of future of injury.

**Question:**

What loads might a runner be exposed to?

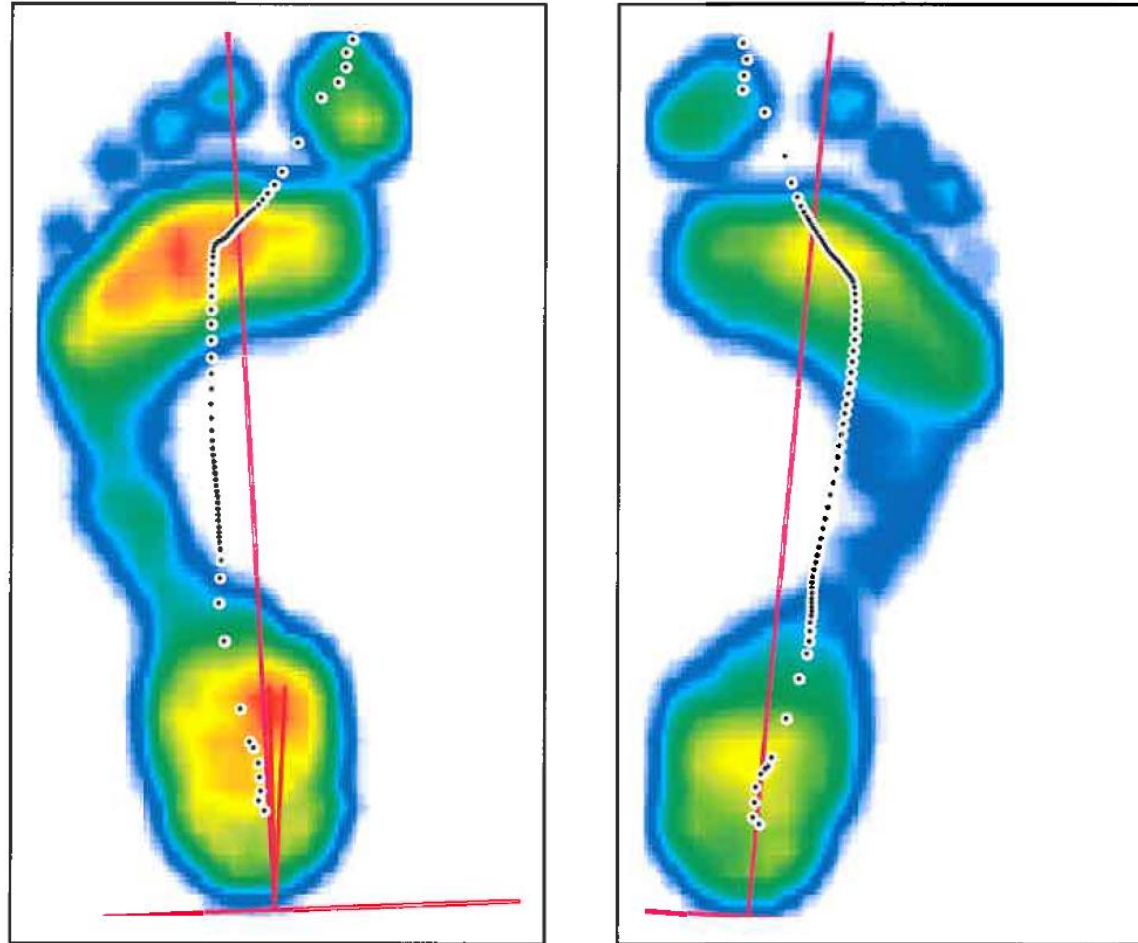
**Answer:**

Anything that loads all or a part of their tissue differently to how it has been before.

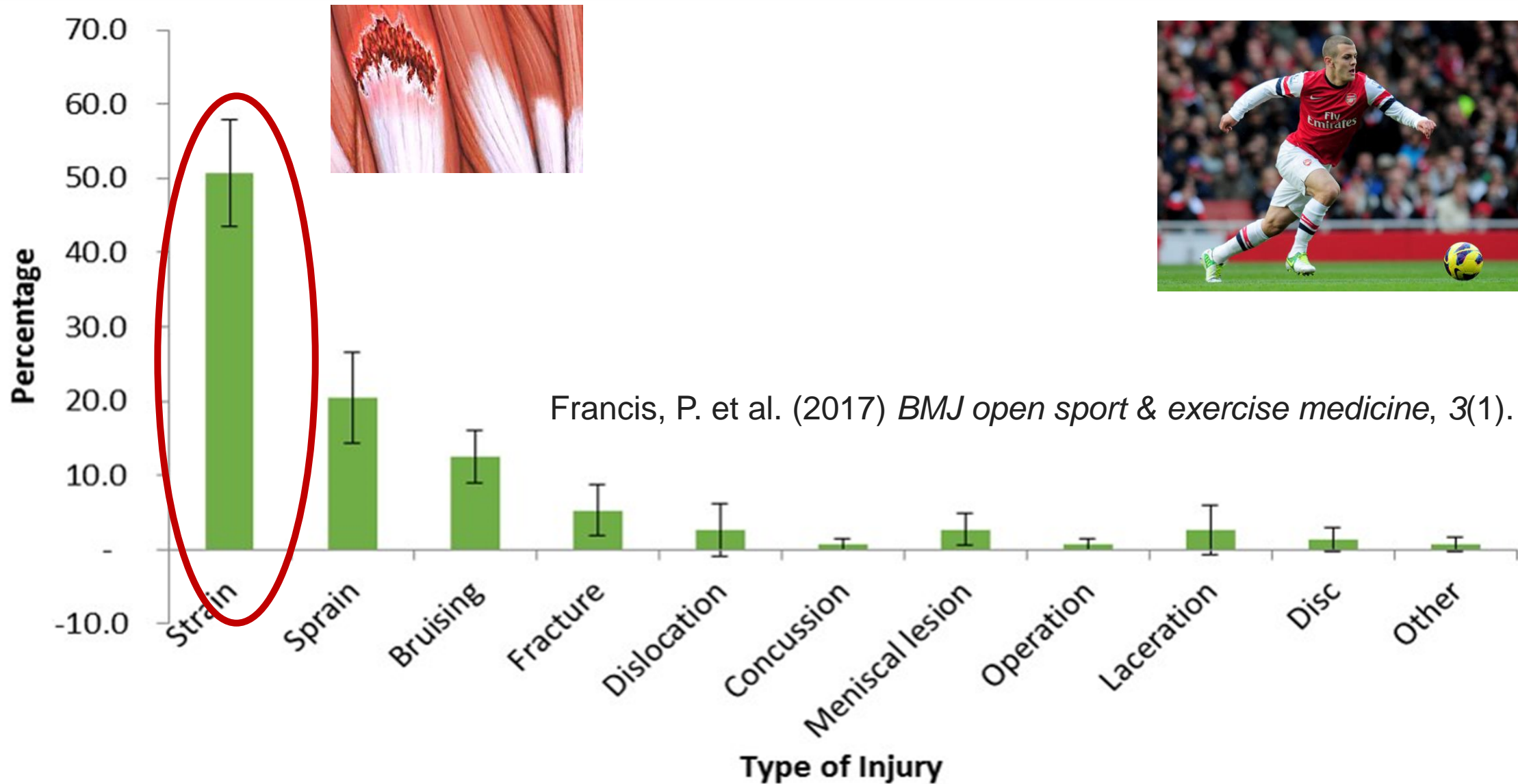
**Question:**

Is it the new shoes or the new load?

## Section 2: How do runners load?



# What are the most common running injuries?



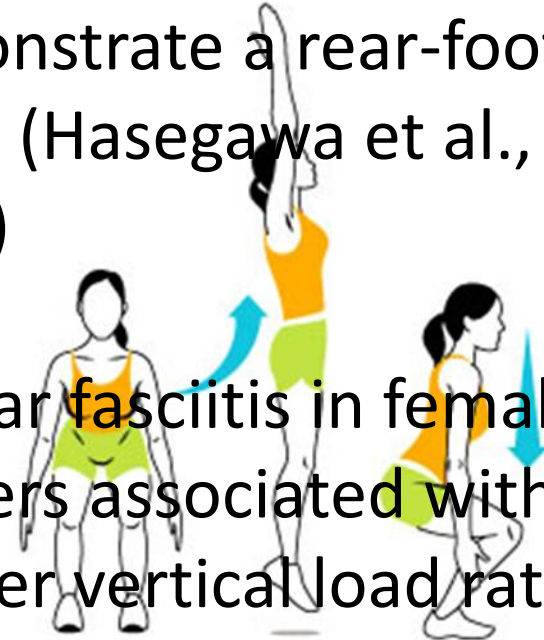
Francis, P. et al. (2017) *BMJ open sport & exercise medicine*, 3(1).

# Try it and see....extended and flexed!

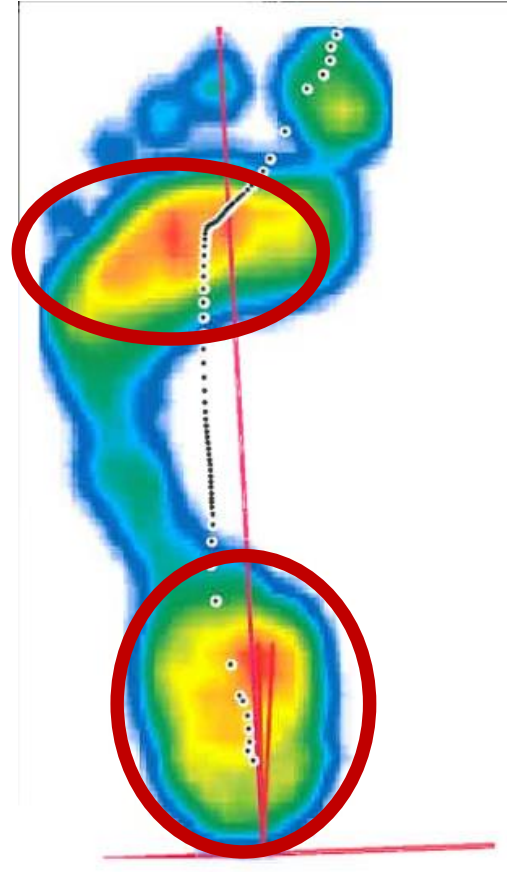


- 75% of runners demonstrate a rear-foot strike (Hasegawa et al., 2007)

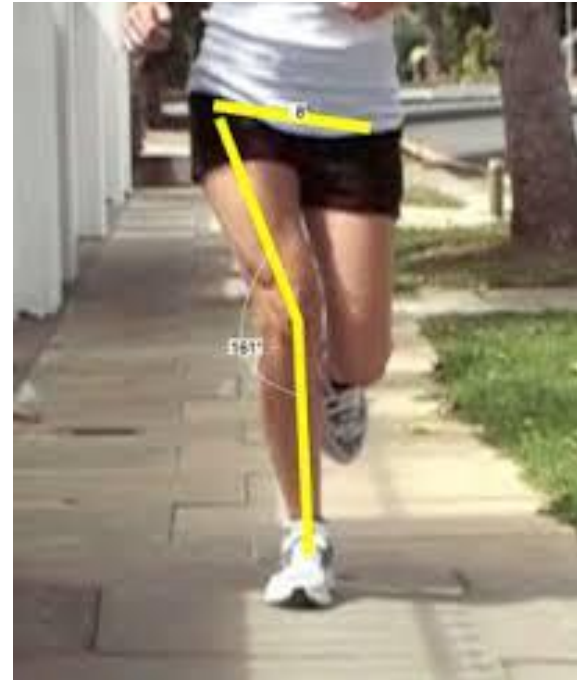
- Plantar fasciitis in female runners associated with greater vertical load rates and impact peaks (Pohl et al., 2009)



## Section 2: How do runners load?

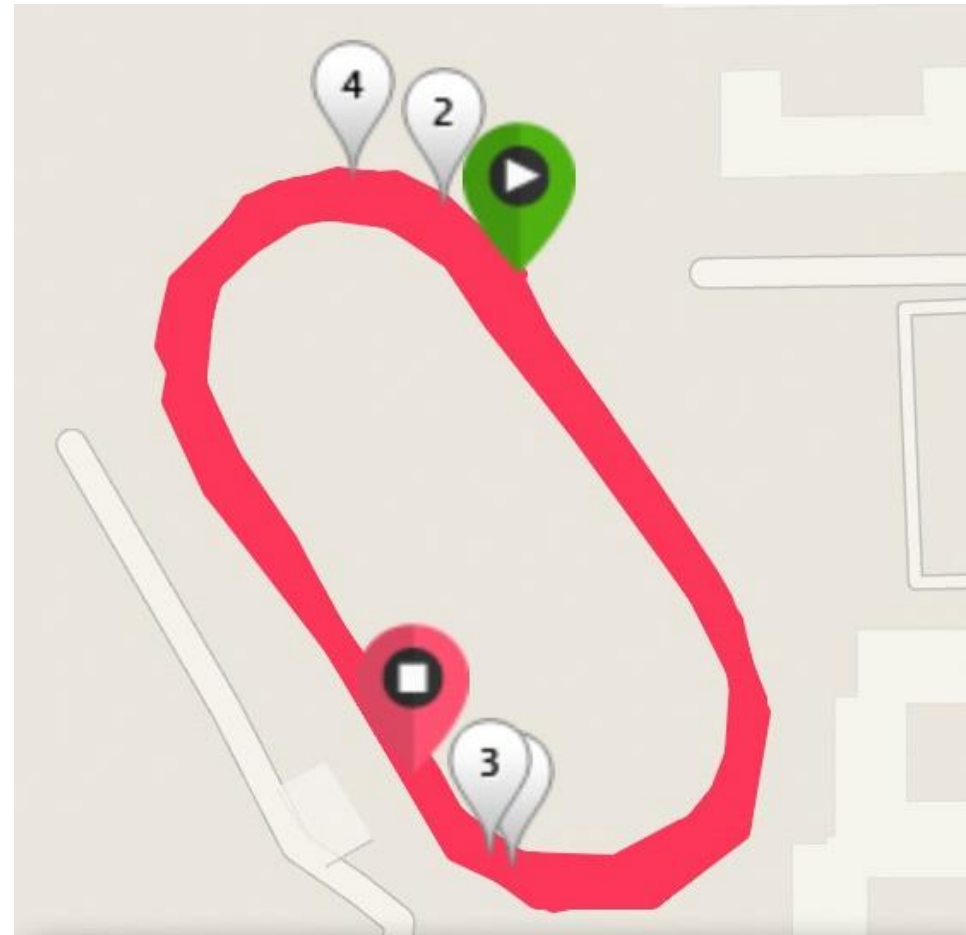
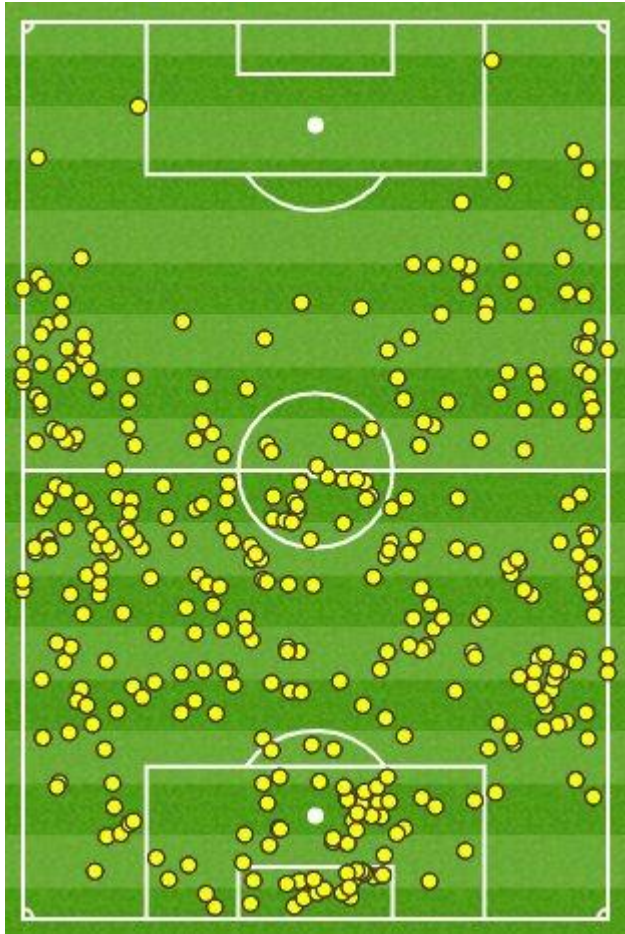


# How do runners load?



(Powers et al., 2003; Souza et al., 2010)

# Runner vs. Footballer?



## Section 2 Take Home Messages

- Passive tissues in runners are over-loaded
- Extended lower limbs on ground contact contribute to passive tissue overload
- This may suggest inadequate use of muscles
- Runners have very little movement variability

# Why do runners get injured and how do we stop it?

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# 3 Major Challenges

- Load management (taming the chimp)
- Finding ways to use muscles
- Finding ways to increase variability

# 1. Load management...

Running –  
Yaay!



I used to  
run more  
miles

My PB is...

What  
minute  
miles is  
that?

My friend  
does  
this...



# Load Management...



Erase the past...

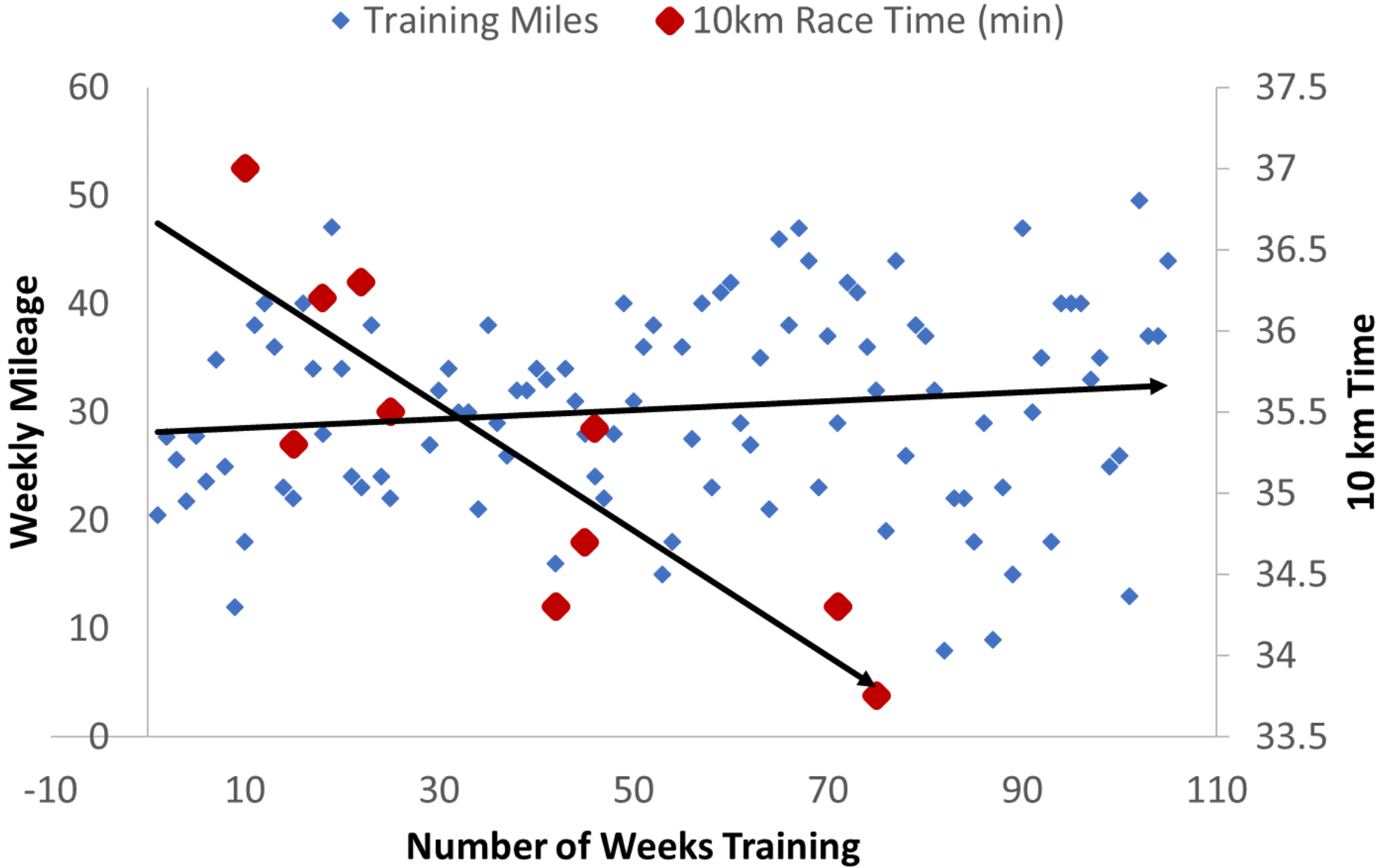


Accept the present...

# Load Management...

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Injury Prevention 30-min Cross-trainer	Plyometric Drills	9-mile intensive Run Yoga	Circuit Training	Yoga	Park Run	10 – 12 miles

# Load Management...

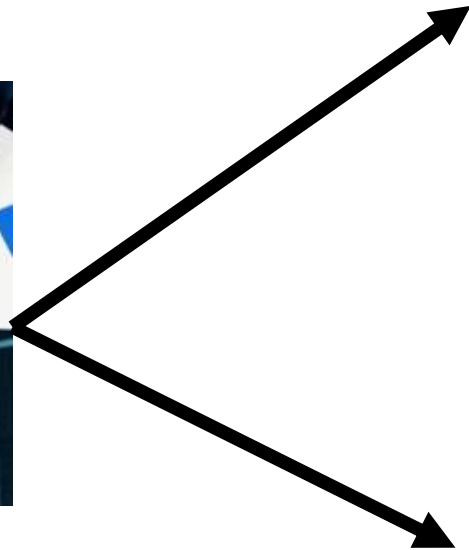


# Load management...ABC

- *you can run without head-space but you can't train.*



**Never claw it back.**



**Squeez it in.**



**Make time.**

# 3 Major Challenges

- **Load management (taming the chimp)**
- Finding ways to use muscles
- Finding ways to increase variability

## 2. Findings ways to use muscles...



We used to use muscles...



Muscles that help us run like this...



Over-time this changes...

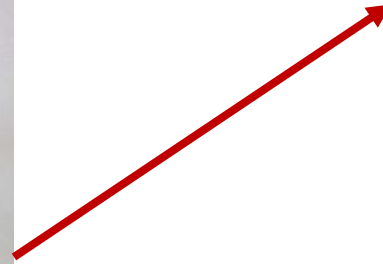
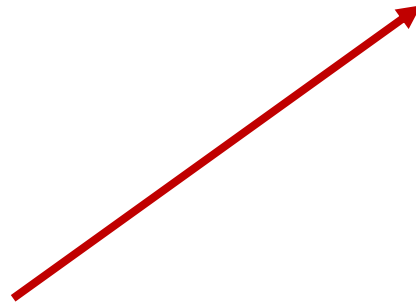


Over-time this changes...

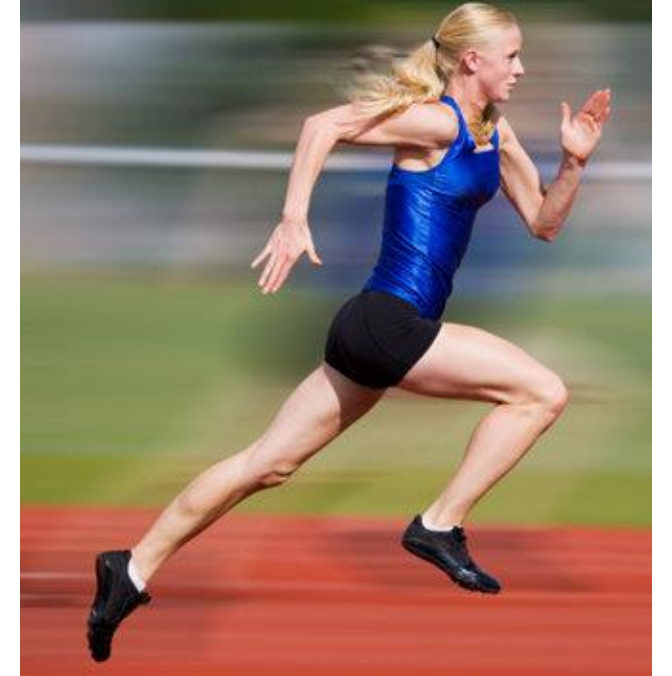


## 2. Findings ways to use muscles...

Isolated – Functional - Dynamic



## 2. Findings ways to use muscles...

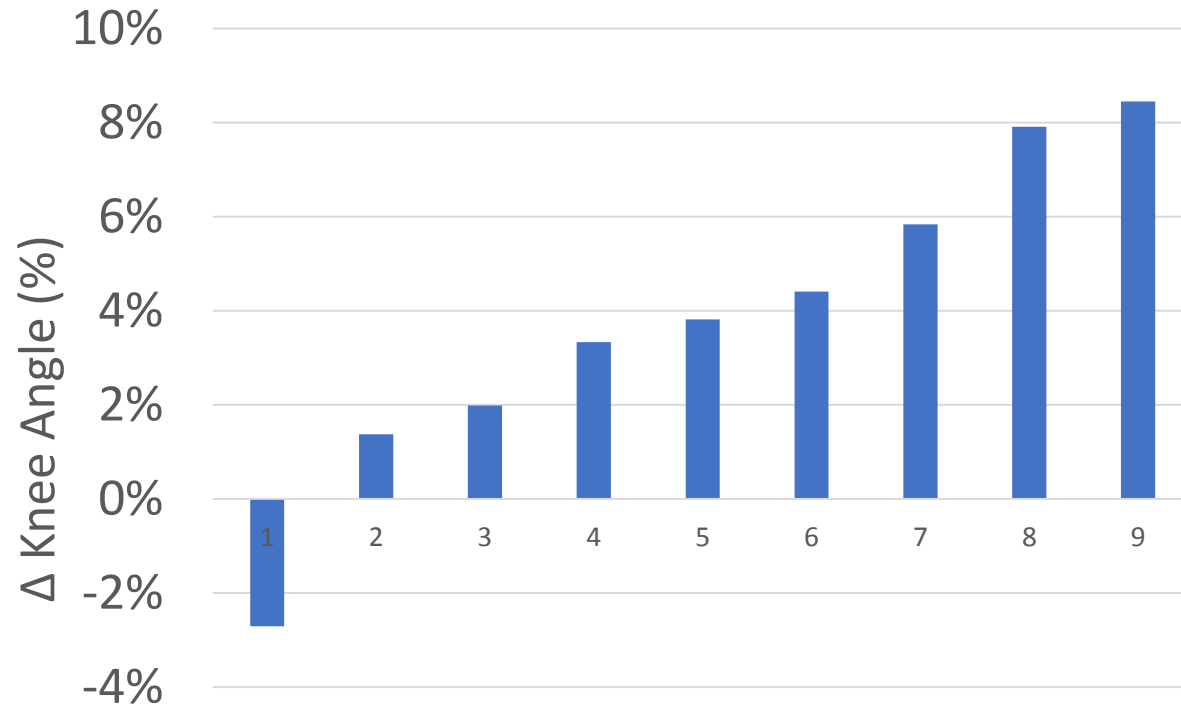


Load management: 1 x 400m?

## 2. Findings ways to use muscles...



# Biomechanical changes shod vs. barefoot

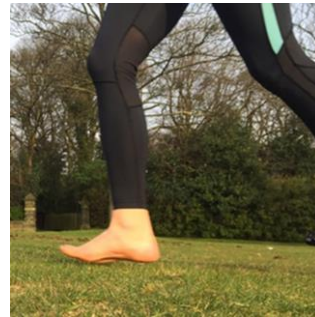
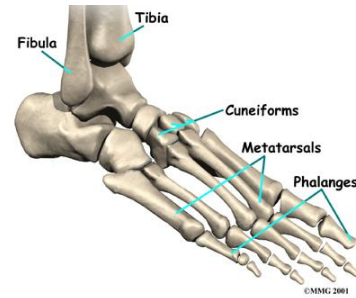


Francis et al. (2016) *Journal of sports science & medicine*, 15(3), p.417.

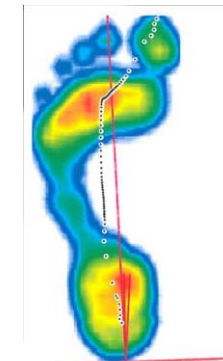
# 3 Major Challenges

- **Load management (taming the chimp)**
- **Finding ways to use muscles**
- Finding ways to increase variability

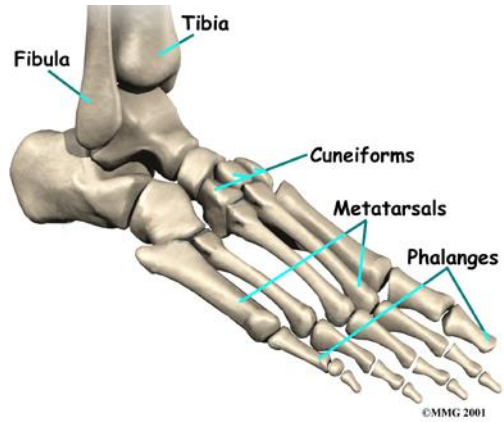
# Spot the difference...



Francis et al. (2017) *International Journal of Athletic Therapy and Training*, pp.1-17.



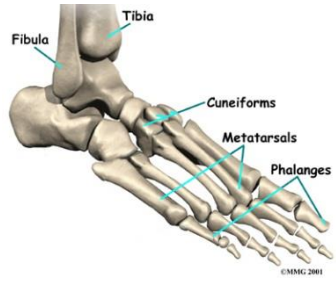
# Variability...



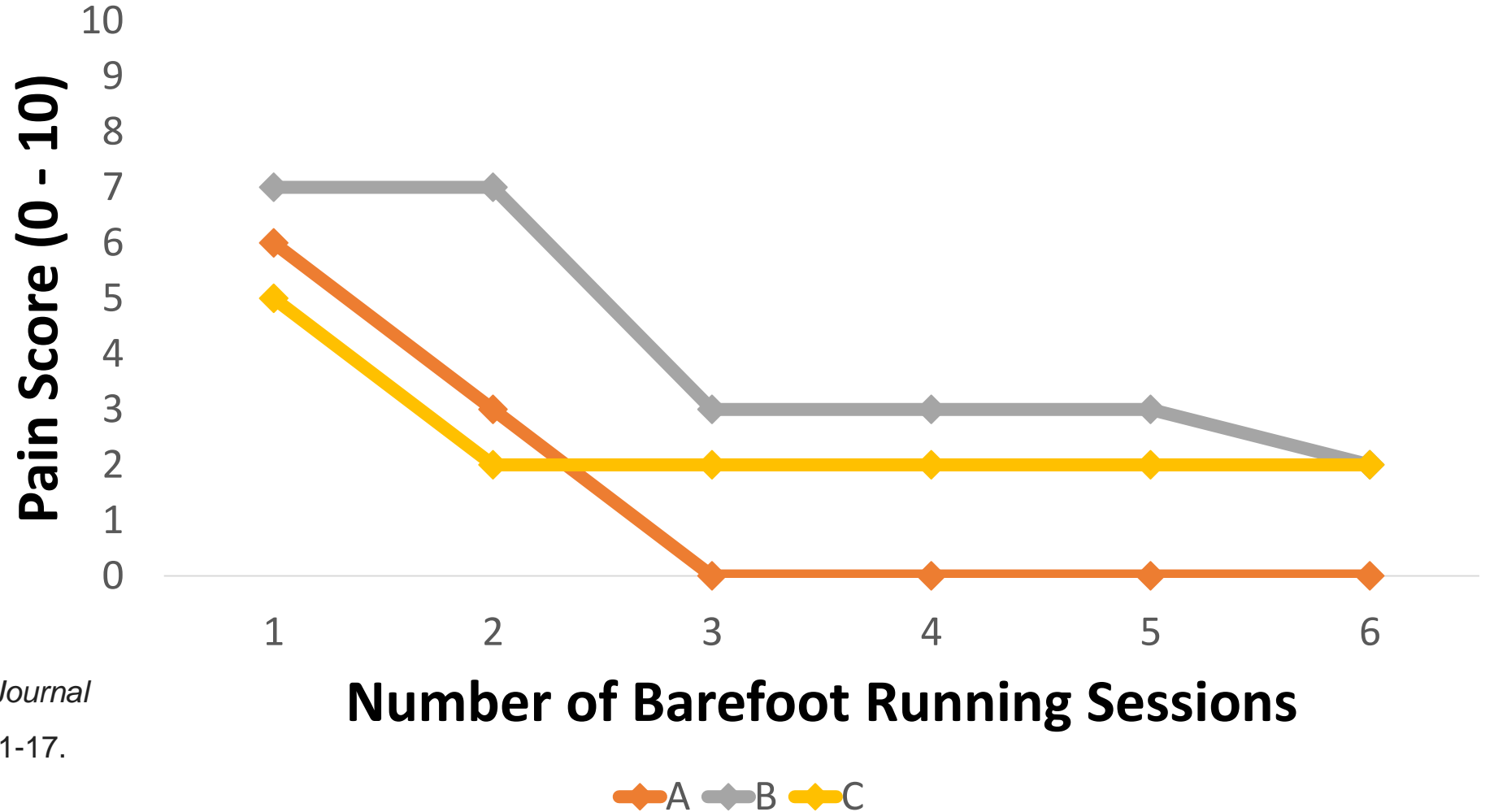
maximum variability



minimal variability



# Pain Response to Barefoot Running in 3 Runners with Plantar Fasciitis



Francis et al. (2017) *International Journal of Athletic Therapy and Training*, pp.1-17.

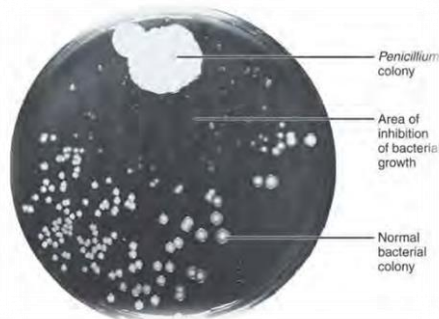
# Differences Down Under...



Francis, P. (2018) *Journal of foot and ankle research*, 11(1), p.42.

# Science...

- *An incremental body of knowledge generated through (chance) observation*





# Science...

## School, sport and around the house

- 2-points = barefoot most of the time
- 1-point = barefoot half of the time
- 0-point = barefoot none of the time



**South Africa: 90.9% Barefoot**

**Germany: 100% Shod**

Hollander et al. (2017) *Scientific reports*, 7(1), 8079.

# A Study Started from Chance Observations...

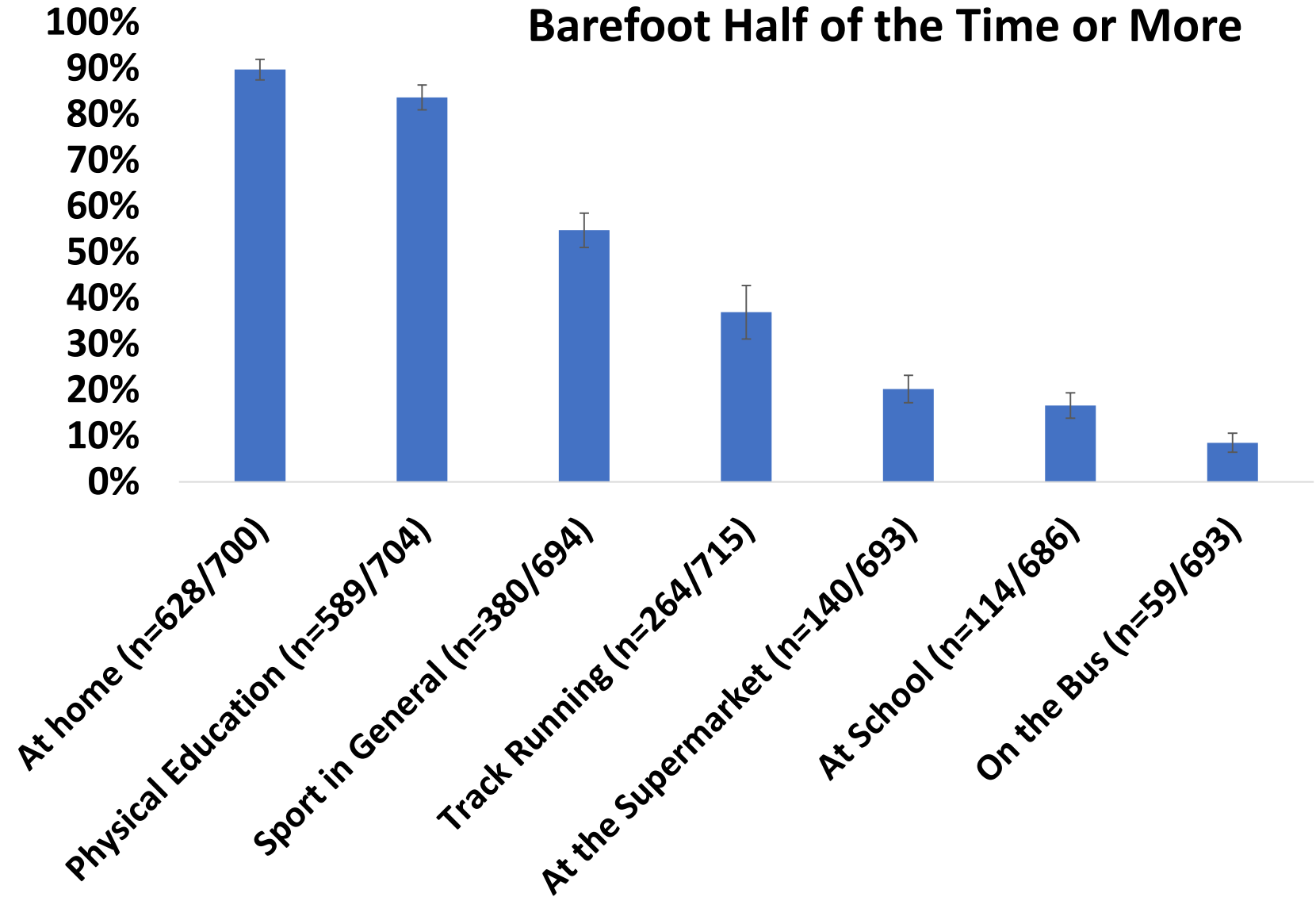
- 11 – question survey (3 demographic, 8 activity related)
- School, Sport, Around the House, **PE, Supermarket & Bus**
- Distance, surface and footwear at most recent schools athletics event
- Exercise related leg pain in the last 12-months



SCIENTIFIC  
REPORTS

# Results

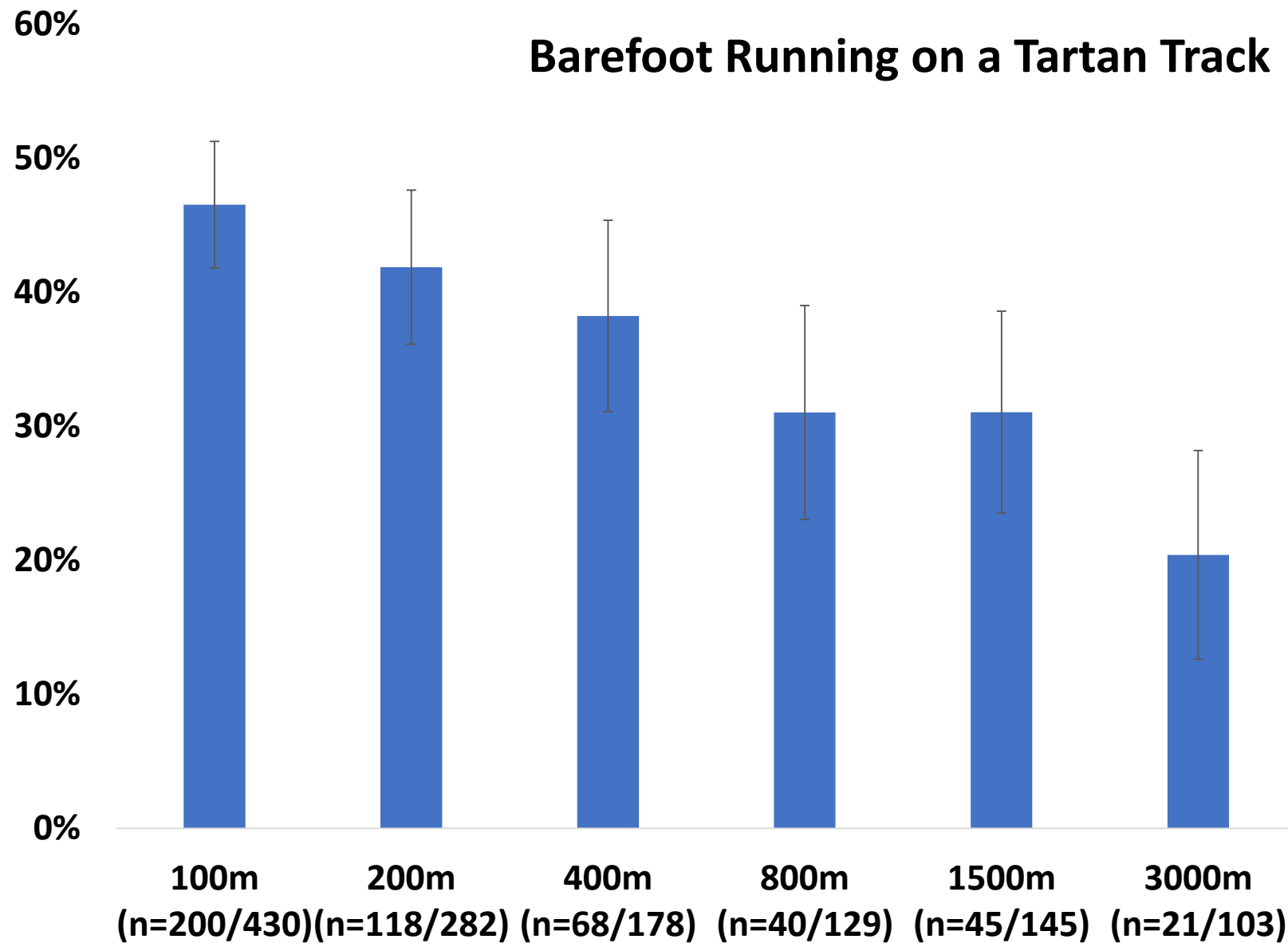
- 45.3% *habitually barefoot.*



# Results



## Barefoot Running on a Tartan Track



# Results

- The prevalence of exercise related leg pain that stopped boys running in the past 12-months was 23.5% (n=168)
- Prevalence of injury in school based physical activity (USA): 34-38%  
(Aaron and Laporte (1997) *Ex and sport sci rev*, 25(1):391-406).
- Prevalence of leg pain in high school cross-country athletes (USA): 48%  
(Reinking et al. (2010) *J Athl Train* 2010, 45(1):51-57).

# Discussion

## Footwear Habits

- Germany: 100% Shod
- South Africa: 90.9% Barefoot
- New Zealand: 45.3% Barefoot



## Economic Resources

- 19<sup>th</sup>
- 93<sup>rd</sup>
- 35<sup>th</sup>



## Climate

- Temperate
- Arid & Temperate
- Temperate

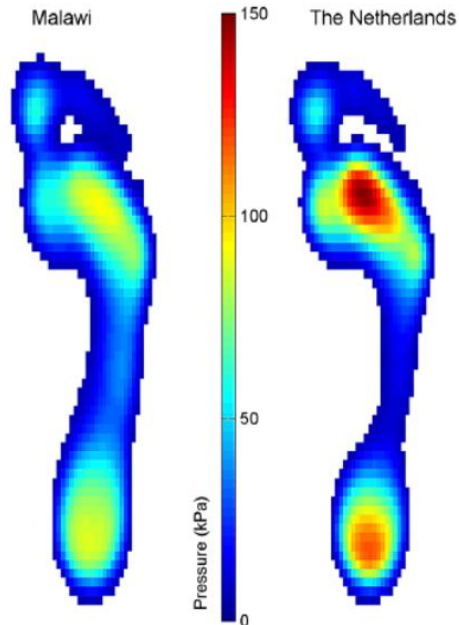


Gregson J (2017) *Global Finance*, February, **13**.

Kottek (2006) *Meteorologische Zeitschrift*, **15**(3):259-263.

# Discussion

- 20 – 47% of boys competed (100m – 3,000m) barefoot on a tartan surface.



- Growing up habitually shod leads to differences in foot morphology

*If they want to do it, should we tell them otherwise?*

*Is this injury prevention?*



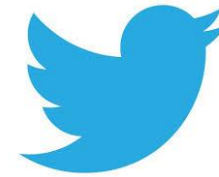
# 3 Major Challenges

- **Load management (taming the chimp)**
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- **Finding ways to increase variability**

# So what do I do now?

- Design a variable program where no two days are the same.
- Think about the volume of running you can do comfortably....try to do it for 10-weeks.
- Keep a spreadsheet of your training whereby it is easy to see what you have been doing.
- Engage in some form of strength and conditioning.
- Incorporate 10 – 15 minutes of easy barefoot running on grass a couple of times per week.
- At least once a week run as fast you can / up a hill.
- Make the headspace to run!

# Questions...



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