Wed 11am T12

This summer I'm publishing a book on lower limb tendinopathy and this presentation is essentially a spin-off from my research for the book and my clinical work with novice runners.

My patients are often keen to quiz me about it, I expect yours are as well.

The primary reported motivating factors for going minimalist are
injury reduction,
performance enhancement
curiosity.

Rothschild CE (2012) Primitive running: a survey analysis of runners interest, participation and implementation. Journal of Strength and Conditioning Research, 26, pp 2021-2016.

If we go back in time we can have a look at when all this barefoot stuff started.

Early human ancestors have been walking upright without shoes for 3.5+ million years.
Bipedalism and larger brains have defined our evolution from the great apes.
Within this time period evolution has helped us to run longer distances more efficiently.
It is noted that bipedalism occurred before the development of larger brains.
Running is good for your brain!? But we know that already.

# Back to the Future…

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**1978 – Nike Tailwind**

1978 – Nike Tailwind– The original Nike Air.

Cushioned shoes were available from the early 1970s.

Speculated that we may have had some minimalist foot protection up to 45,000 years ago

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No such thing as a barefoot shoe. You can have either no shoes or minimalist shoes.

With any form of shoe you will have reduced Proprioception,

added weight,

and any potential changes seen from running barefoot are often lessened by even the thinnest of minimalist shoe.

On balance the simple protection offered by minimalist footwear over no footwear has led to minimalist running becoming more popular than pure barefoot.

Think stones, glass, and dog deposits!

Two broad categories.

Top down approach:

HEAD

1. Increased awareness of surface, foot posture and plantar pressure.
2. Increased anticipatory muscle contraction in preparation for ground contact.

HIPS

1. Greater hip extension and gluteal activation.
2. Less hip abduction and less loading through the hip.

KNEE

1. Considerably less peak force through the knee.
2. More knee bend and absorption through the knee joint.

ANKLE

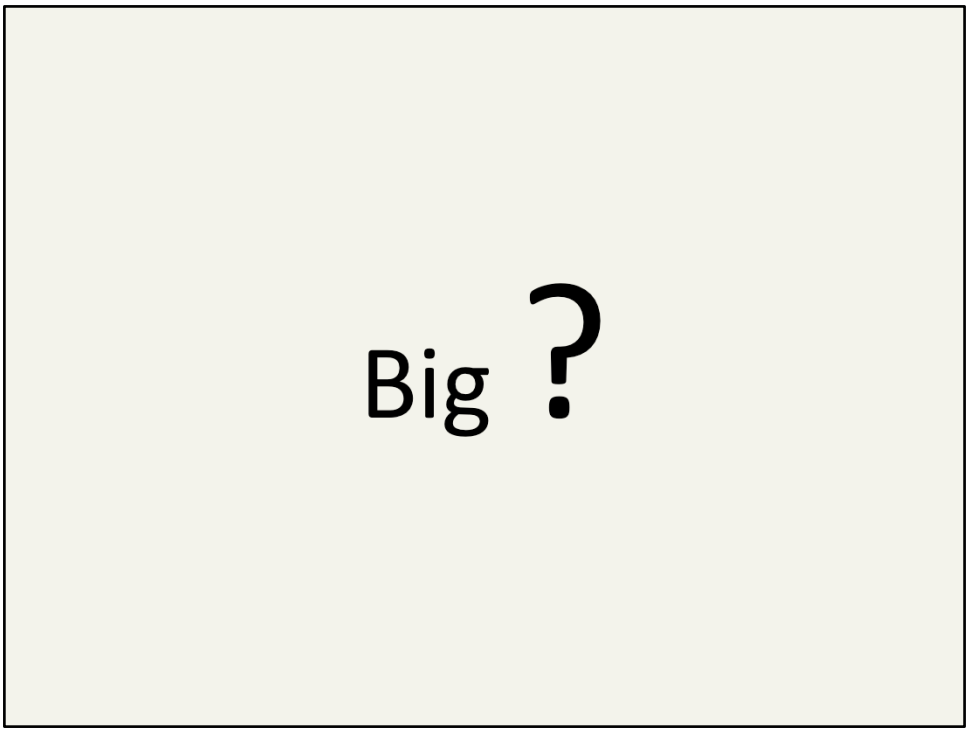
1. Absorbs force through eccentric dorsiflexion during initial stance phase.
2. Uses the Elastic Achilles tendon to save energy.

FOOT

1. Joints and muscles of the foot provide absorption of impact forces.
2. Foot gets stronger. (reduce pronation?)
3. Plantar skin thickens (Glaborous skin).

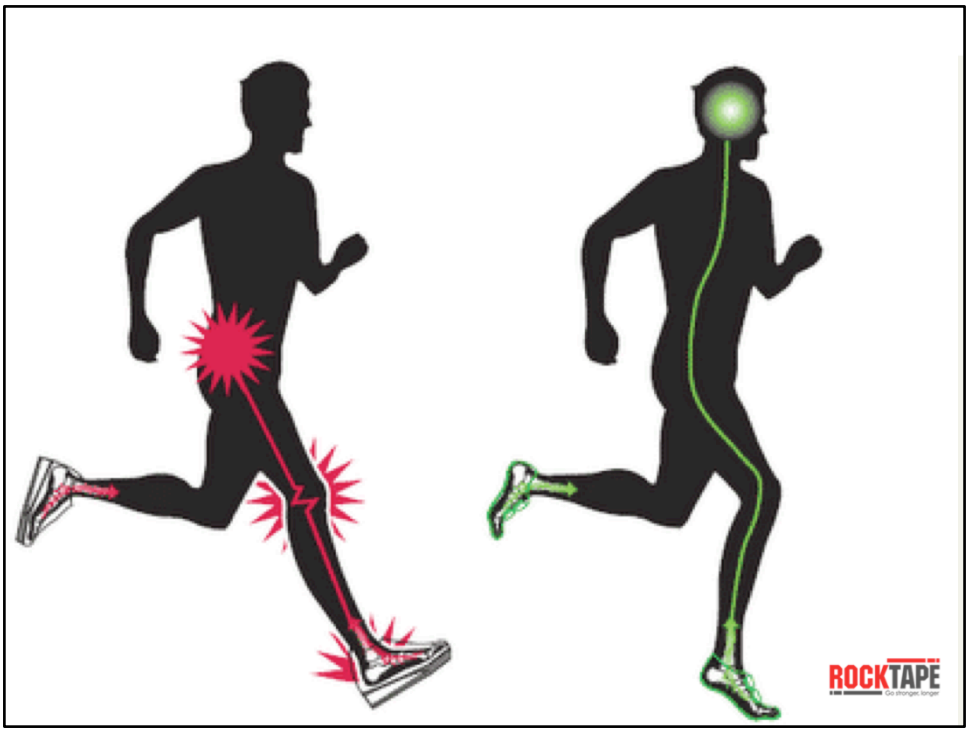
OVERALL

1. Decreased stride length
2. Increased step rate
3. Has been reported as more efficient and economical




Think about everything I have just said in favour of barefoot running.
Its all true, or at least well evidenced.
The BIG Q is

Is it about the shoe?




Think about it,

Everything I have just said refers to running technique.

You can run with that technique in a shoe.

Cant you????

*Key Point: Running technique is more important than what you wear on your feet, but what you wear on your feet may influence your running technique.*

# Key Point

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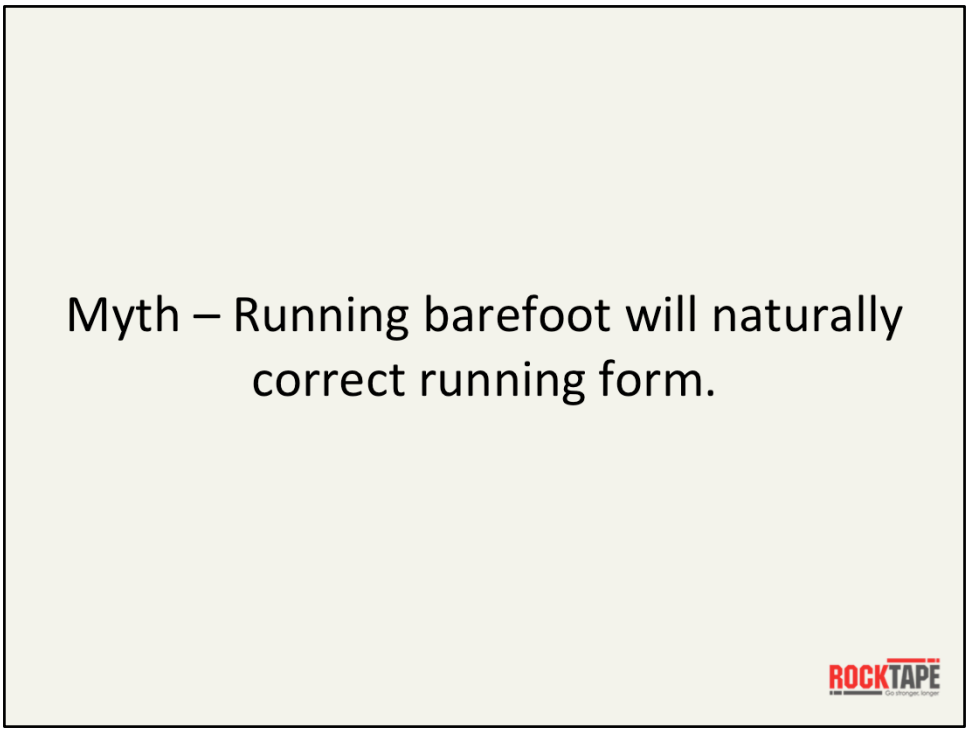
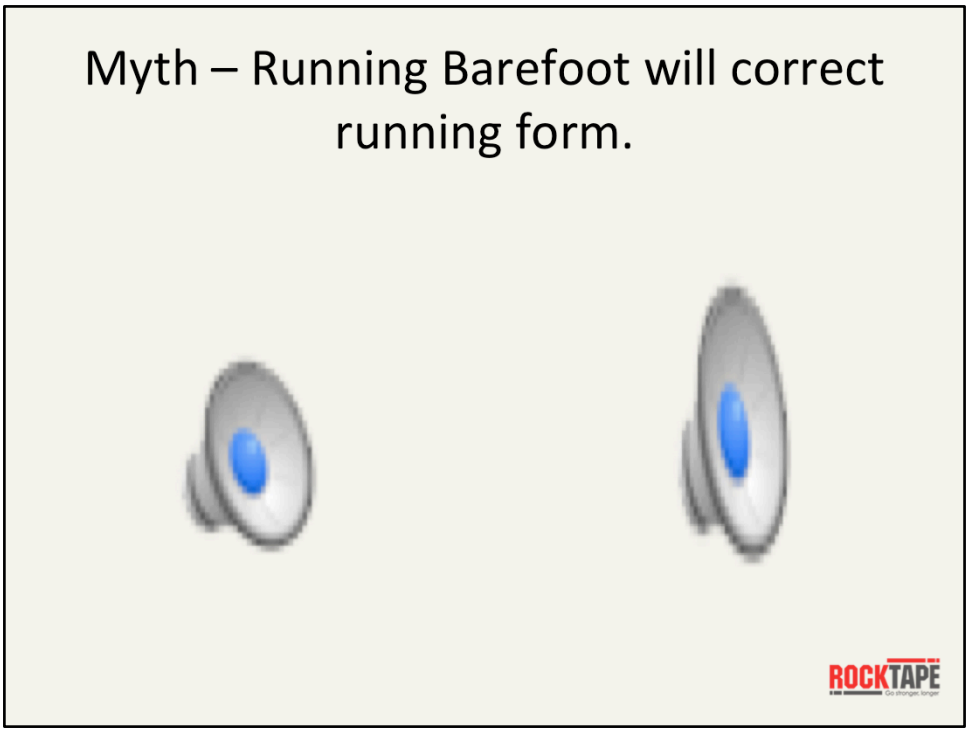



A fair assumption.
Without the cushioning from a trainer you change your technique to be better at absorbing forces.
Unfortunately its never that simple.
Going barefoot is not a panacea for correcting all of your running woes.




A few studies have found that when you switch habitually heel striking shod runners to barefoot running some of them keep heel striking.
Barefoot heel striking is even worse than shoe heel striking.
A study involving more than 1000 habitually shod barefoot runners revealed that 77% of the runners maintained a RFS pattern when barefooot. Nunns M, House C, Fallowfield J, Allsopp A, Dixon S (2013) Biomechanical characteristics of barefoot footstrike modalities. Journal of Biomechanics, 46, (15) pp 2603-2610.

51 habitually shod runners demonstrated great variability in their response to BF running. Only 31% of the runners had lower loading rates. Authors comment that the acute response to BF running is not instinctive. Tam, N., Wilson, J. L. A., Coetzee, D. R., van Pletsen, L., & Tucker, R. (2016). Loading rate increases during barefoot running in habitually shod runners: Individual responses to an unfamiliar condition. *Gait & posture*, *46*, 47-52.

# Patient Suitability

## More suitable…

- Kids with healthy developing feet
- Just starting or very novice runners
- During the offseason to help with technique

- Lighter runners (>80 kgs)
- Habitual midfoot or forefoot strike pattern

- Those suffering with knee pain
- Those suffering with hip pain
- Those suffering with anterior compartment syndrome

- **Will strengthen the plantar flexors and intrinsic foot muscles**

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**Suggested that wearing shoes is detrimental to the development of the medial longitudinal arch**.
Rao UB, Joseph B, (1992) The influence of footwear on the prevalence of flat foot. A survey of 2300 children. Journal of Bone and Joint Surgery. 74, pp 525-527.

**And results in less flexible feet.**

## Less suitable…

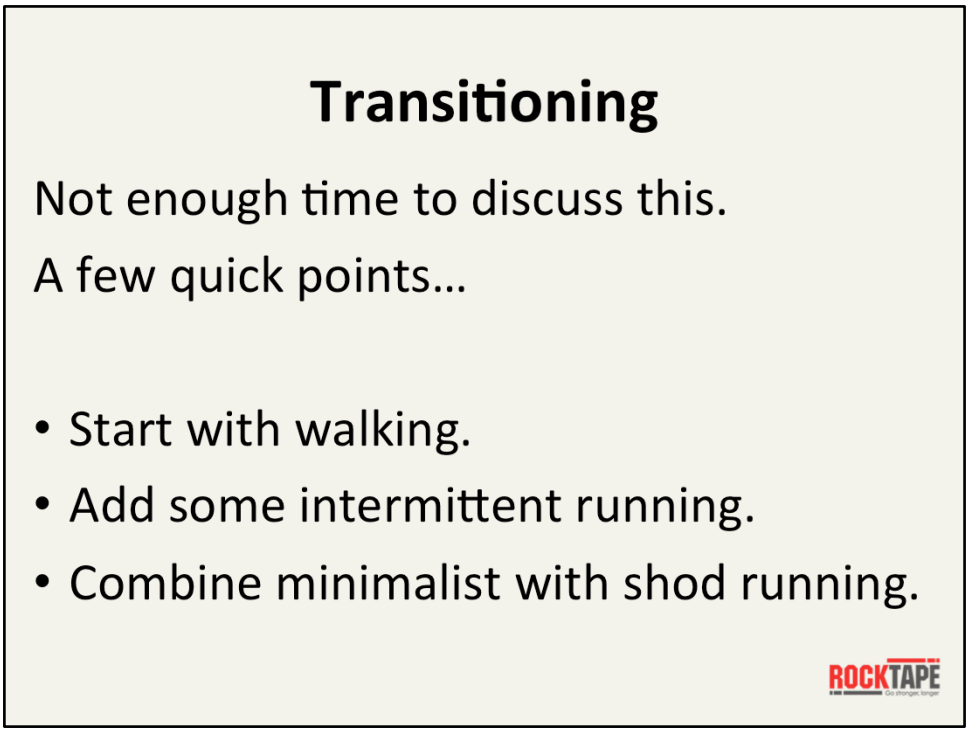
- Experienced and regular runner without injury.
- During the competitive season or intense training.

- Heavy hitters (<80 kgs)
- Habitual heel strike

- Those suffering with Achilles tendon pain
- Those suffering with Plantar foot pain
- Those suffering with MTSS

- **May overload the plantar flexors and intrinsic foot muscles and the metatarsal bones.**

Medial tibial stress syndrome




This is a separate lecture

Not enough time to discuss transitioning but we cant talk barefoot without a mention of transitioning.

Through careful transitioning you can help less suitable patients gain some of the benefits of minimalist running or walking. If you feel its worth the effort.

Which of these would be **most suited** to minimalist running?

**Myth or Fact?**

***Minimalist running reduces injury risk***

***Does Minimalist running reduce injury risk?***

- It's a BAD question and misleading for our patients.
- If minimalist running was around first and for longer, should we not ask the question.

  ***Do modern running shoes reduce injury risk?***

- **There are too many variables to provide an evidence based answer to this.**

This is a bad question.

One study found that their survey reports found fewer MSK injuries in BF compared to SH runners but this difference was not present when the reduced training mileage of the BF group was factored in.

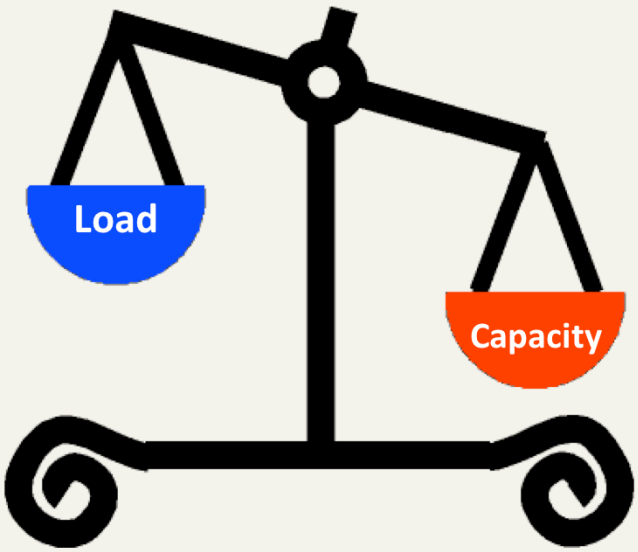
The BF group did report more calf muscle injuries but less foot arch injuries.

Perhaps the foot intrinsics adapt faster than the gastrocs.

Altman A, Davies I (2015) Prospective comparison of running injuries between shod and barefoot runners. British Journal of Sports Medicine, 0, pp 1-6.

The two key variables we can assess and manipulate are……NEXT SLIDE

# Management of **load** and **capacity**

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*In conclusion…*

We can't apply a simple solution to a complex problem.

Thank you for listening
Leave your email at the RockTape stand to receive the notes and references from this talk

Today @ 11:45 in Sport Theatre 10 **Shoulder Taping: How to do a better job, look at movement not pain**

Tomorrow @ 11:45 in Sport Theatre 10 **Tendon Rehab Achilles and Patellar Tendinopathy**

Tomorrow @ 12:30 COPA Theatre 7 **Ankle & Hip Mobility Drill Demonstrations**

**Daniel Lawrence**

ROCKTAPE

End

# Foot gets stronger

**10.6% increase in abductor hallucis cross sectional area after 10 weeks in Vibram five fingers.** Johnson A, Myrer J, Mitchell U, Hunter I, Ridge S (2016) The Effects of a Transition to Minimalist Shoe Running on Intrinsic Foot Muscle Size. International Journal of Sports Medicine, 37, pp 154-158.

**21% Cross-Sectional-Area Flexor digitorum brevis and 18% in adductor digiti minimi after 12 weeks. In a Merrell or NewBalance minimalist shoe.** Miller E, Whitcome K, Lieberman D, Norton H, Dyer R (2014) The effect of minimal shoes on arch structure and intrinsic foot muscle strength. Journal of Sport Health and Science. 3, pp 74-85.

# Reduce pronation?

- 8 female cross-country runners, gradually transitioned to BF running over 4 weeks. Foot position was measured in standing before and after intervention. Significant decreases in overpronation were seen. Russell RM, Simmons S (2016) The effects of Barefoot running on overpronation in runners. International journal of Exercise Science: Conference Proceedngs: Vol.8 Iss 4, Article 42. Available at [digitalcommons.wku.edu?ijesab?vol8?iss4?42

# Increased efficiency

- Lower Utilisation of Oxygen from lower shoe weight and altered technique. Cheung RT, Ngai SP (2015) Effects of footwear on running economy in distance runners: A meta-analytical review. Journal of Science Medicine and Sport. Available from: [http://dx.doi.org?10.1016?j.jsama.2015.03.002]