

## Running Retraining Master Class

I attended a 2-Day master class in Sydney in June 2018, with Physio Rich Willy PhD, from Montana in the USA. He is a world leader in research into running related injury and I've compiled the following short notes on some of the takeaway messages I picked up on the 2 days. Any errors are all mine!

### Injury Risk

Previous history of injury = biggest predictor of injury. Inadequate rehab? Poor fitness and smoking strongly predictive as well. Novices running >3km in 1st week very risky

Structure and posture (eg flat foot, tight hamstring): least important contributing factor to running related injury

Pronators: most common foot type, lowest injury risk!

Stretching: no effect on injury risk. If you enjoy it, do it. Time better spent doing strength training

### Shoes

Shoes don't matter, until they do. They do when you are injured. Eg forefoot injuries have certain shoes that minimise symptoms

No evidence for injury protection and footwear. If uninjured, ignore shoe salespeople. Find shoe that's comfortable out of the box, then find another similar one and rotate them. Rotating shoes decreases injury risk 39%

Runners don't do well with rapid changes, shoes are no exception

Minimalist shoes: reduce knee loads, increase achilles loads and increase injury risk over the short-medium term compared to normal run shoe

Zero-drop shoes: not a good idea for middle aged male runners: recipe for achilles problems

Maximalist shoes: no difference in injury risk compared to normal run shoe.

### Exercise for Improving Resilience

My personal bias, that strength training in runners is vastly under-utilised, was strongly confirmed over the course of the 2 days.

Collagen production is something Physios are very interested in for runners with tendon problems. It is stimulated by exercise and loading and helps improve stiffness and resilience of tendons. Luckily, collagen production is the same for the following conditions:

- an exercise of 10 sets of 10 reps at 70% of max strength (ie normal strength training parameters)
- 1 hour of leg extensions (bad idea)
- 36km run

This shows us that we can stimulate tendon with strength training exercises to produce the same load as you would put your tendons through in the longest run in a marathon prep. Can't go wrong getting strong.

Running on a soft surface leads to a 10-fold increased risk of tendon pain. Some shoes may be enough to contribute to this. If you are older this is worse, your tendons have less stiffness, more stretch with same load. Some injuries do better on hard surfaces

Treadmill running:

- cadence increases slightly,
- increases load on achilles, reduces loads around hip.
- We can use this info in return to running programming

To improve load capacity of tissue: need to isolate exercise and add **heavy** load.

- Body weight "functional" exercise = waste of time, same load on achilles as walking!
- Single leg squat or bodyweight calf raise = waste of time
- Doing exercises in sets of 15 or more reps = waste of time

Calf muscle forces during running are about triple those of the glutes. Need to spend more time strength training from the knee down. "Lazy glutes" come from lazy Physios/PT's etc (my opinion)

Following strength: need to start plyometric training for major muscle groups, increases tendon stiffness

Return to running: need a solid baseline of loading history: walk 7500 steps/day for weeks before re-introducing running. Can be going on during rehab.

## Running Analysis

50% of people who call themselves mid- or forefoot strikers, actually aren't. They actually heel-strike

80% of runners are heel strikers

Running analysis: keep it simple, don't need expensive technology with numerous measurements. Dr Willy has stopped complex digital measurement of angles as it didn't help patients identify what they were trying to change. Should be understandable in a Tweet!! Keep it simple

Running form is not dictated by muscle weakness. EG: glute strengthening programmes don't stop your knee collapsing in, or hip dropping.

Running retraining using cues and feedback is needed to change running form. This can be accomplished with a structured program of up to 3 hours running over 2 weeks, with positive changes persisting for months after stopping the retraining program.

Changing running cadence seems to have biggest positive effect at the knee, then the hip, and the least effect at the ankle.

No real need to measure specific angles and forces using elaborate wearables or force platforms. Can make changes to forces by changing the shape of your running form.

We did practical sessions looking at 3 main running mechanical patterns and strategies to retrain coordination of running form using different forms of feedback.