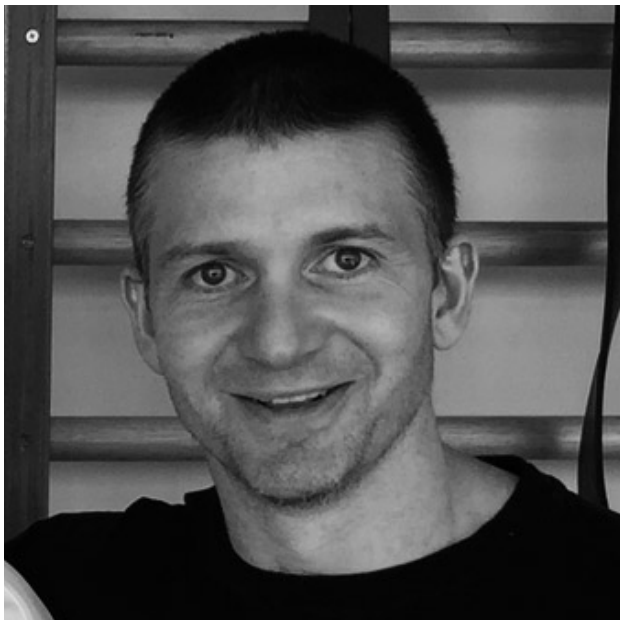
LECTURE



MARK **KILGALLON**

Head Strength Coach

Sydney Swans

"Building The Wheels"

Training the Wheels

Mark Kilgallon

The Human Foot






S&C Training







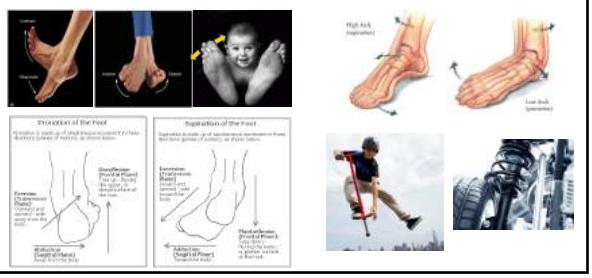

Part 1: Foot Function & Anatomy

Roles of the Foot

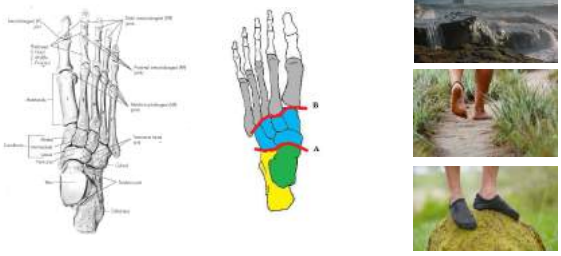
- Provides adaptive base of support - "Mobile Adaptor"
- Sensory interface with environment
- Proprioceptive role in balance
- Attenuates, dampens and transmits forces
- Spring in propulsion
- Rigid lever to aid push off

Highly complex & individual

Foot Movement



Bones of the Foot

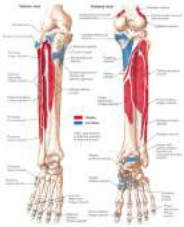


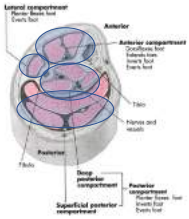
Joints of the Foot

- Tibiotalar
- Subtalar
- Midtarsal
- Tarsometatarsal
- Metatarsophalangeal
- Interphalangeal

Muscles of Foot - Extrinsic

- 4 Groups (location and function)

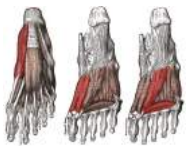




Muscles of the Foot - Intrinsic

- 4 subgroups

Dorsal Muscles (2)
- Extensor Hallucis Brevis
- Extensor Digitorum Brevis



Big Toe (3)
- Abductor Hallucis*
- Flexor Hallucis Brevis
- Adductor Hallucis

Small Toe (2)
- Adductor & flexor Digiti minimi
- Openens Digiti Minimi

Muscles of the Foot - Intrinsic

Central Group (4)
- Lumbricals (4)
- Quadratus Plantae
- Flexor Digitorum Brevis
- Interossei

Arches of Foot

Part 2 – Training The Foot (Intrinsics)

Longer Term - NMES Strength Effect?

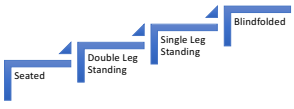
- Fourchet 2009
- Elite Junior Throwers
- 6 weeks 3/week of NMES of plantar muscles training
- Navicular Drop
- Sig. decrease in navicular drop in training group 8.8mm – 5.8mm
- Conclusion: Increased medial arch support (potentially from increased strengthening/tone plantar musculature)

Intrinsic Strength Exercises

Short Foot Drill

- Coaching cues – "relax toes"/even extend toes slightly
- Pull front of big toe towards heel
- Make the foot shrink
- Raise arch

Short Foot
Potential Progressions



- Mulligan 2013: 4week program (3min/day).
- Significant decrease in navicular drop (maintained 4 weeks post)
- Sig improvement in static and dynamic stability tasks
- Training Effect - Improved support of MLA & foot stability.

Progression – Dynamic Barefoot Training

- Bruggemann 2005: Athletes switched to training shoes WITHOUT arch/rearfoot support – significant increase CSA intrinsic muscles after 5 months training
- Chen 2016: MRI Runners transitioning to minimalist shoes
- Sig increase in lower leg and foot muscle volume after 6 months of training.
- Rose 2011, Bowser 2017: Various levels of supportive footwear. As support was progressively reduced....
- Single leg landing tests & dynamic stability progressively improved
- Reduction initial peak vertical GRF
- Shinohara 2009: Postural stability improved in barefoot v thin socks

Barefoot Running & Injury Reviews

J Am Acad Orthop Surg. 2016 Mar;24(3):180-7. doi: 10.5435/JAAOS-D-14-00343.

Orthopaedic Perspective on Barefoot and Minimalist Running.

Roth J[1], Neumann J, Tao M.

Sports Med. 2013 Nov;43(11):1131-8. doi: 10.1007/s40279-013-0093-2.

Barefoot running: does it prevent injuries?

Murphy K[1], Curry EJ, Matzkin EG.

Med Sci Sports Exerc. 2017 Apr;49(4):752-762. doi: 10.1249/MSS.0000000000001141.

Long-Term Effects of Habitual Barefoot Running and Walking: A Systematic Review.

Hollander K[1], Heidt C, VAN DER Zwaard BC, Braumann KM, Zech A.

- Lack of high quality research into efficacy of barefoot running (or shod) for injury prevention
- More long term research required

Barefoot Training Recommendations

- Barefoot training may be useful tool to strength & conditioning coach (**small progressive doses of activity**)
- Potential injury prevention and foot robustness adaptations (improved force dampening / conditioned myofascia)
- Potential for new injuries - Overload!!!!!!
- Avoid fatigue in less trained!!!!!!
- Some athletes may be contraindicated from barefoot training

Training the Foot – Sydney Swans S&C

- Mike Boyle: The Big Rocks (Jar Analogy)

How to Integrate in a Program

- **EMS & Static Intrinsic Foot Exercises**
- **Barefoot Drills & Barefoot Running**
- **Periodisation**

Questions???