

activforce[™]
webinar

activforce[™]
webinar

activforce[™]
webinar



**Foundations of Strength Testing:
Techniques for Ankle**

Monday January 27th, 2025

INTRODUCTIONS

Dr. Daniel G. Stewart,
PT, DPT





Prof. Claire Minshull,
PhD, PGCHE



@Claire_Minshull



@getbacktosport



info@getbacktosport.com



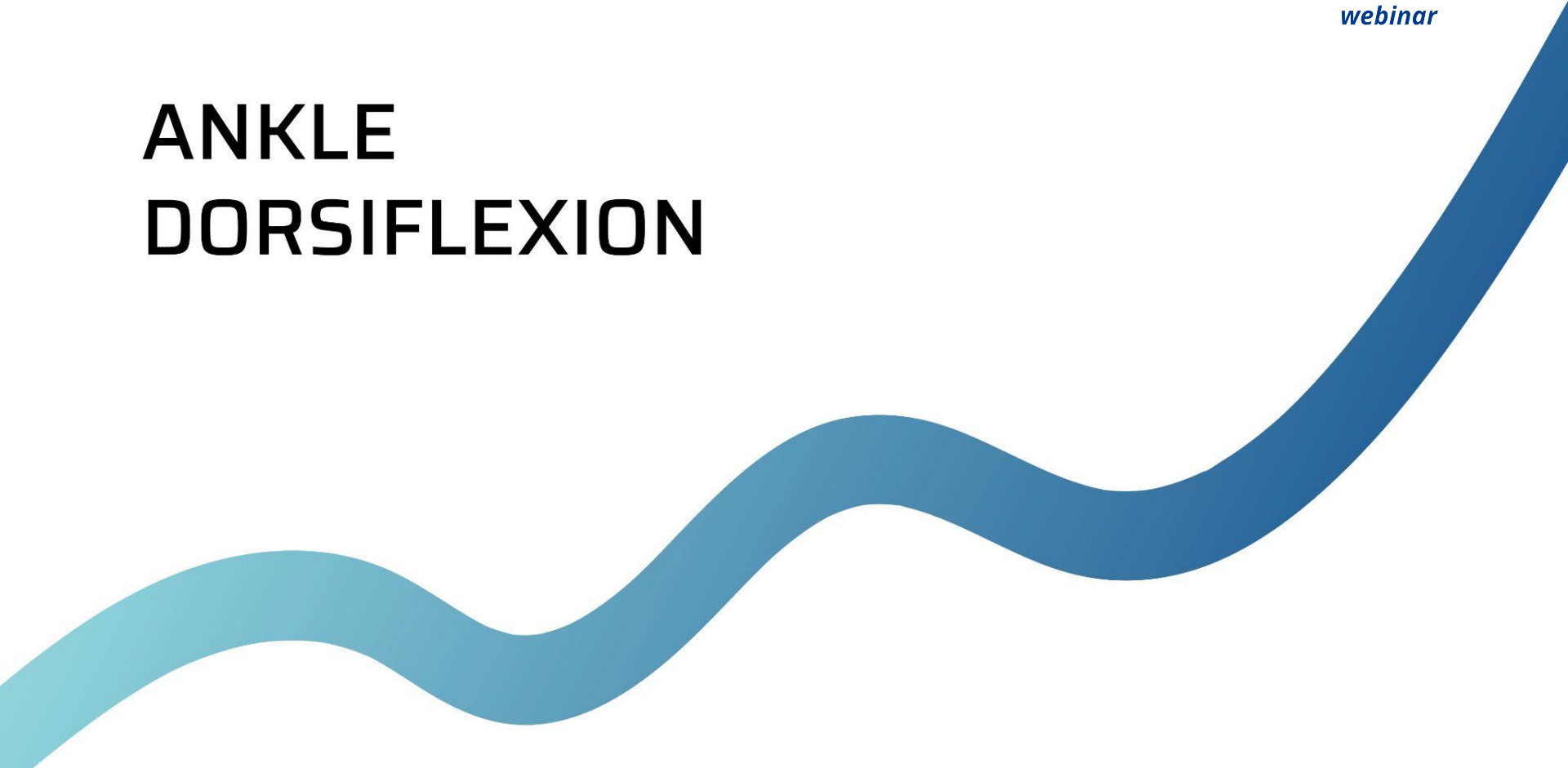
www.getbacktosport.com



Agenda

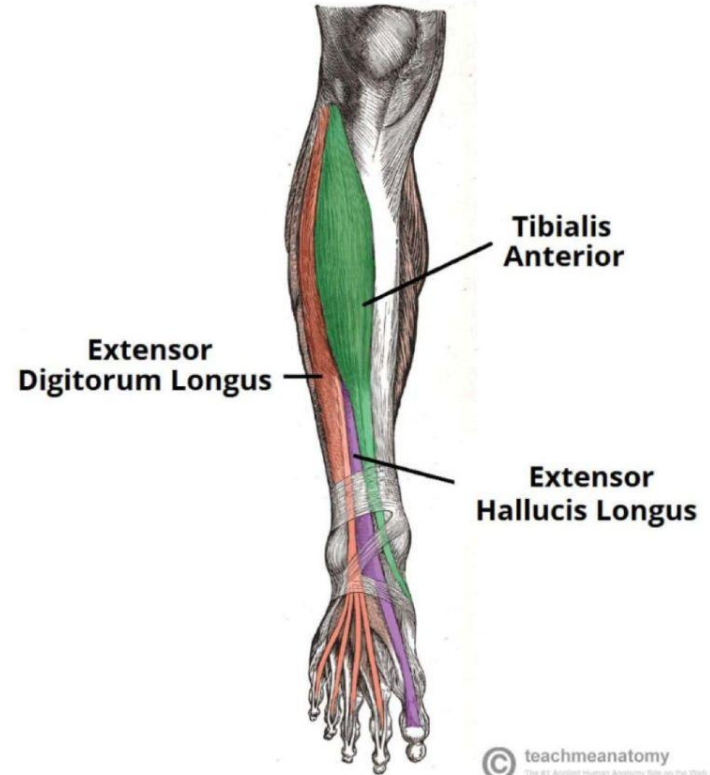
- Introduction to Ankle Strength Testing:
Dorsiflexion, Plantarflexion, Inversion, and Eversion
- Overview of how to test the Ankle
 - Dorsiflexion
 - Plantarflexion
 - Inversion
 - Eversion
- Case Study- Analyzing the data
- Case Study- Possible rehab interventions
- Introduction to Claire's HHD Course

ANKLE DORSIFLEXION



Dorsiflexion

Muscle	Origin	Insertion	Innervation
Tibialis Anterior	Lateral condyle and proximal 2/3 lateral surface of tibia and interosseous membrane	Medial and inferior surface of medial cuneiform bone and plantar base of first metatarsal bone	Deep peroneal nerve, L5, S1



Dorsiflexion

Ankle Dorsiflexion without strap

- Can test in Sitting and Supine
- Testing at different angles:
Neutral, Mid range, End Range, etc
- *Can be with or without a strap*

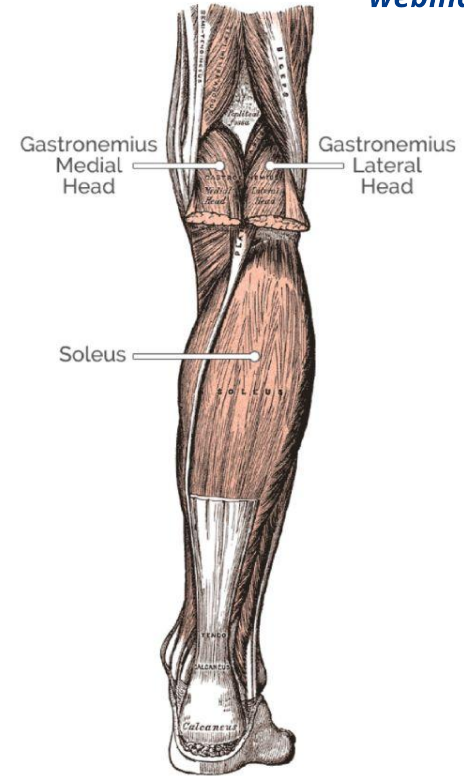


ANKLE PLANTARFLEXION



Ankle Plantarflexion

Muscle	Origin	Insertion	Innervation
Gastrocnemius	Medial head- Posterior surface of distal femur just superior to medial condyle. Lateral head- Upper posterolateral surface of lateral femoral condyle femur	Posterior surface of calcaneus	Tibial nerve, S1, S2
Soleus	Upper 1/4 posterior surface of fibula and posterior aspect of head of fibula, soleal line and middle third medial border of tibia tendinosus arch formed between tibial and fibular attachments	Posterior surface of calcaneus	Tibial nerve, S1, S2



Ankle Plantarflexion

Ankle Plantarflexion without Strap

- Can test in Prone and Sitting
- Testing at different angles:
Neutral, Mid range, End Range, etc
- *Usually with a strap*

Relative Merits & Demerits of HHD Testing



Pragmatic, relatively easy to accomplish in-clinic

Simplicity of device implies simplicity of use

Limited participant familiarisation vs. Isokinetic

Wide availability, but limited training on proper use

Quicker set-up time vs. Isokinetic testing

Attention to detail - protocol & set-up still required*

Portable & instant feedback

Assessor practice & test mastery required*

Range of devices available & low cost

Some require digital apps & software for use

YOU!

*Requirement with any assessment of performance



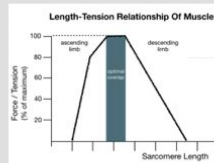
Common challenges - associated with HHD testing, especially manual

Difficulty in restraining extraneous movement

Loss of information - likely underestimation of force production

Strapping & restraints - consistent measurement conditions

+/- movement of tested joint



Joint angle influences force production

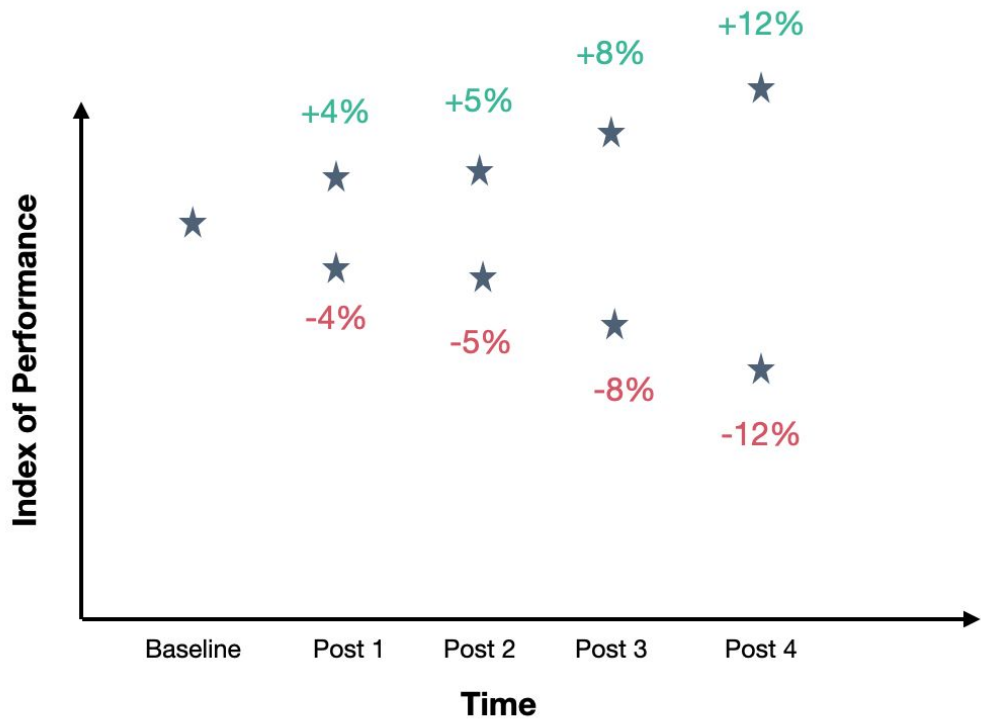




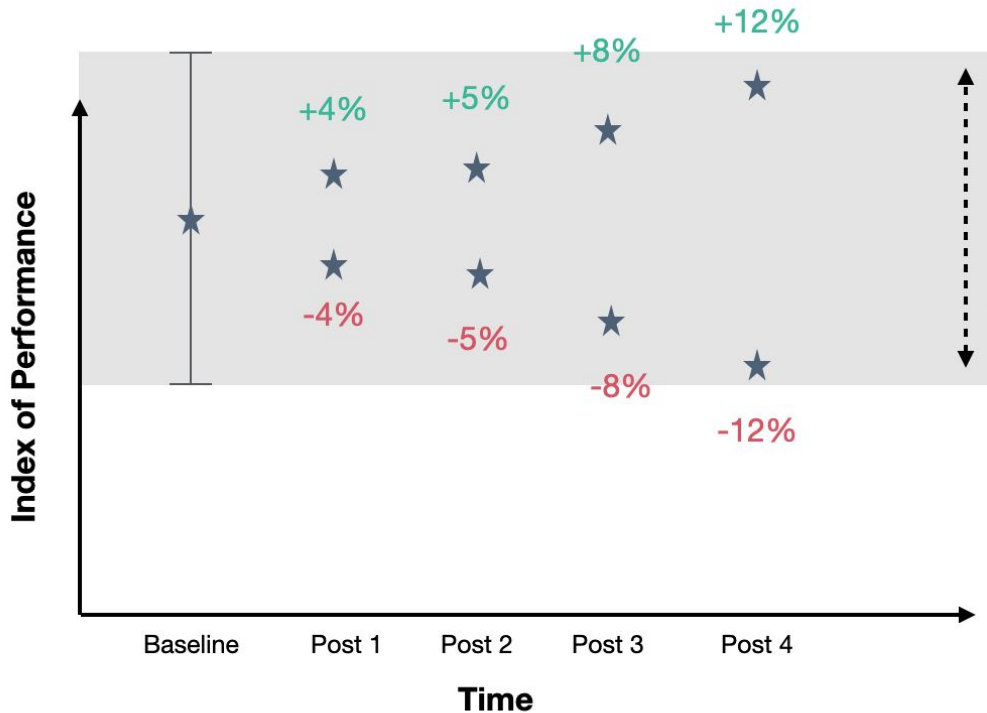
VS



Which point is different from baseline?



Which point is different from baseline?

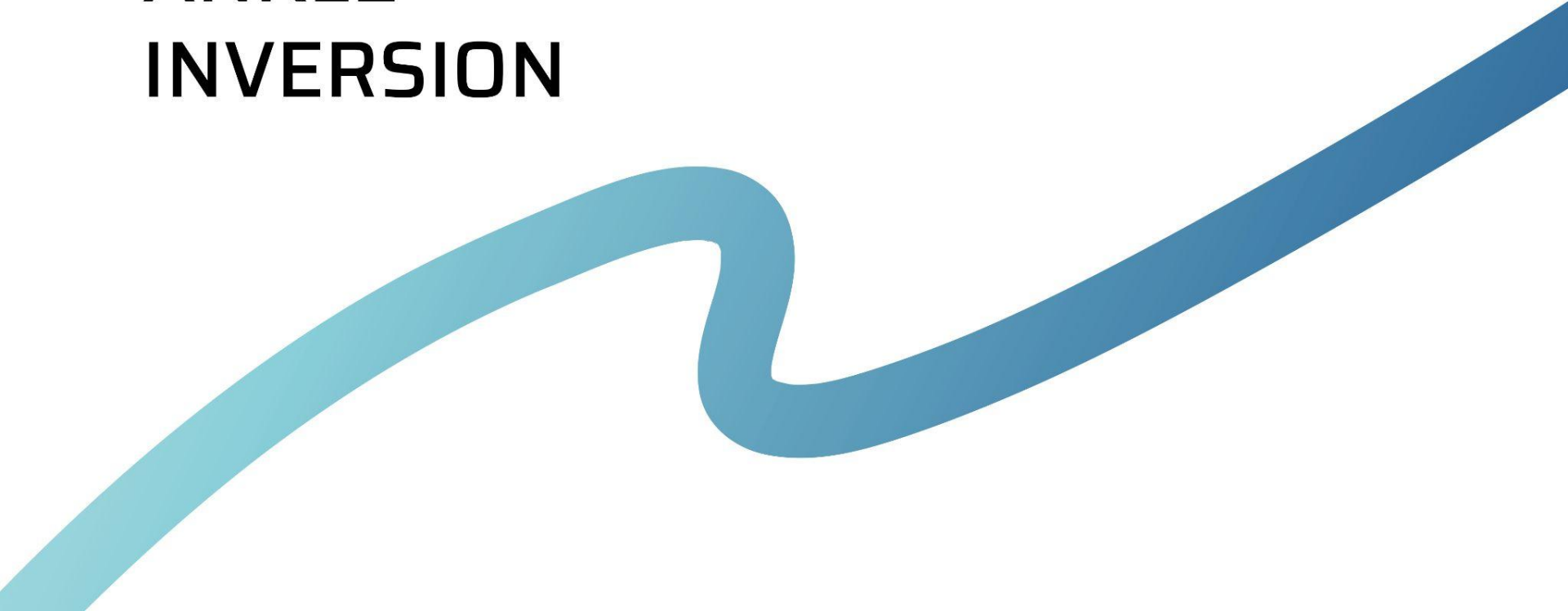


IF technical & biological error = +/- 15%

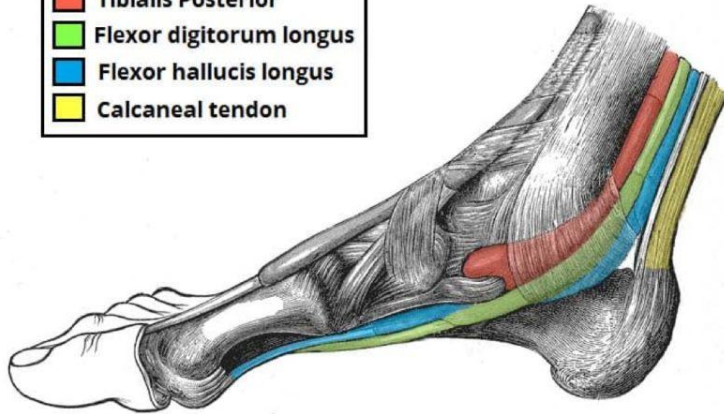
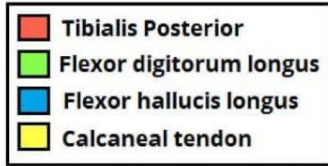


No Change / difference in **INDIVIDUAL** performance

ANKLE INVERSION



Ankle Inversion



Muscle	Origin	Insertion	Innervation
Tibialis Posterior	Posterior surface of tibia, upper half of interosseous membrane, upper posterior surface of fibula	Tuberosity of navicular bone to medial cuneiform	Tibial nerve, L4, L5

Ankle Inversion

Sitting

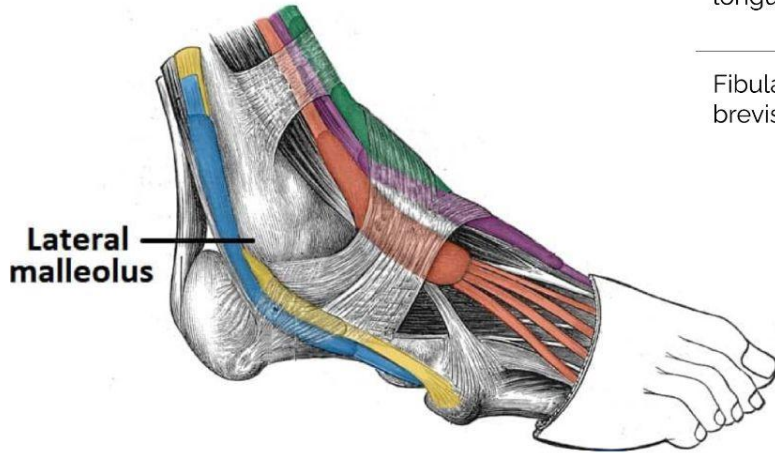
- Can test in Sitting and Supine
- Testing at different angles:
Neutral, Mid range, End Range, etc
- *Usually without a strap*








ANKLE EVERSION



Ankle Eversion



Muscle	Origin	Insertion	Innervation
Fibularis longus	Head and proximal lateral surface of fibula	Lateral plantar aspect of medial cuneiform and base of first metatarsal bone	Tibial nerve, S1, S2
Fibularis brevis	Distal 2/3 lateral surface of fibula	Lateral tubercle at base of 5th metatarsal bone	Tibial nerve, S1, S2

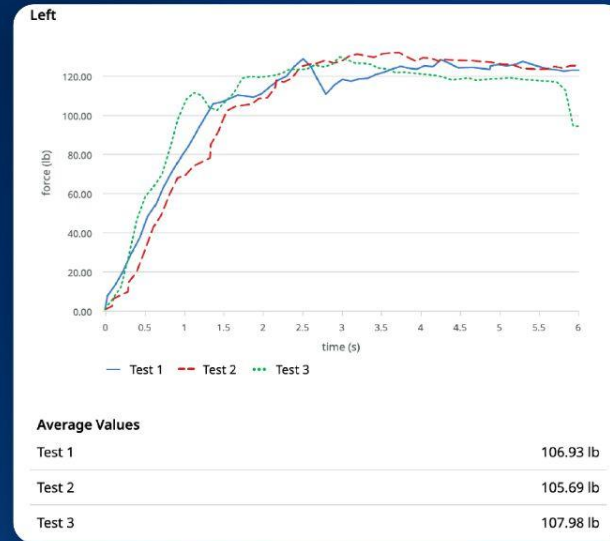
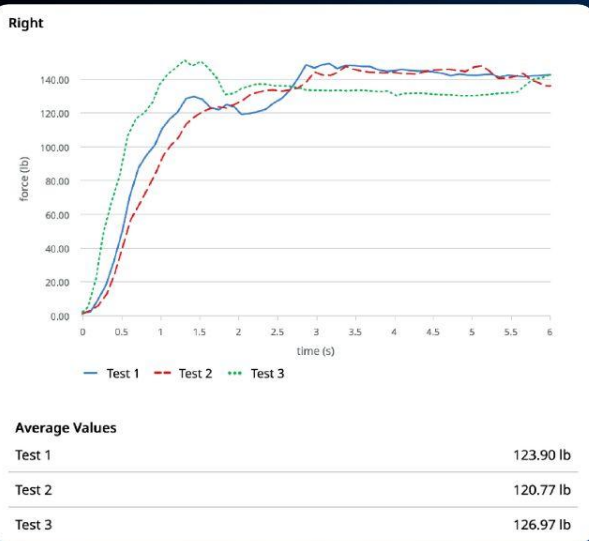
-  Fibularis longus
-  Fibularis brevis
-  Extensor digitorum longus
-  Extensor hallucis longus
-  Tibialis anterior

Ankle Eversion

Sitting

- Can test in Sitting and Supine.
- Testing at different angles:
Neutral, Mid range, End Range, etc
- *Usually without a strap*

Case Study: Plantar Flexion Weakness



Case Study: Plantar Flexion Weakness

Peak Force (lb)

Right	150.94 lb
Left	131.77 lb
Strength Difference	19.17 lb
Percentage Difference	13.56%

Interventions Discussion

**Enrolment
Open**

NEW COURSE

How To Use Dynamometry In Clinical Practice

Unlock the power of hand-held dynamometry with the **first & only** scientifically-underpinned course. Designed and taught by a true expert with decades of experience, this training programme will transform your practice.



All online, work at your own pace

**Enrolment OPEN**getbacktosport.com

**Enrolment
Open**

NEW COURSE

How To Use Dynamometry In Clinical Practice

Unlock the power of hand-held dynamometry with the **first & only** scientifically-underpinned course. Designed and taught by a true expert with decades of experience, this training programme will transform your practice.



All online, work at your own pace



Discount: **DYNO1024**

Enrolment OPEN

getbacktosport.com

Why this online course is uniquely for rehab professionals.

You absolutely need accurate and reliable data - this is a biggie, because:

- you measure individuals not groups
- you use data to monitor progress
- You use data for inter-limb comparisons
- A critical evaluation of weightlifting derivatives & resistance exercise for explosive force production
- ▲ **you use data to inform treatment decisions**
- ▲ **you use data to inform RTP / activity decisions**

“Just because you have a number, it doesn't mean that it's accurate or reliable.

Worse, it can guide you into poor decision-making with your patients & clients.



You receive scores of adverts about HHDs but don't know which one to buy.



You need to conduct accurate and meaningful assessments, but you're not provided with the training on how to do this.



You're poor on time and need answers quickly.



How To Use Dynamometry In Clinical Practice

Welcome

1: Introduction To Dynamometry

5 Lessons

2: What Are We Measuring & Why?

5 Lessons

2.1: The force-time curve

2.2: Peak force & rate of force development (RFD)

2.3: Sampling frequency & RFD

2.4: Intra-individual vs. group performance

2.5: Summary

3: Which Dynamometer?

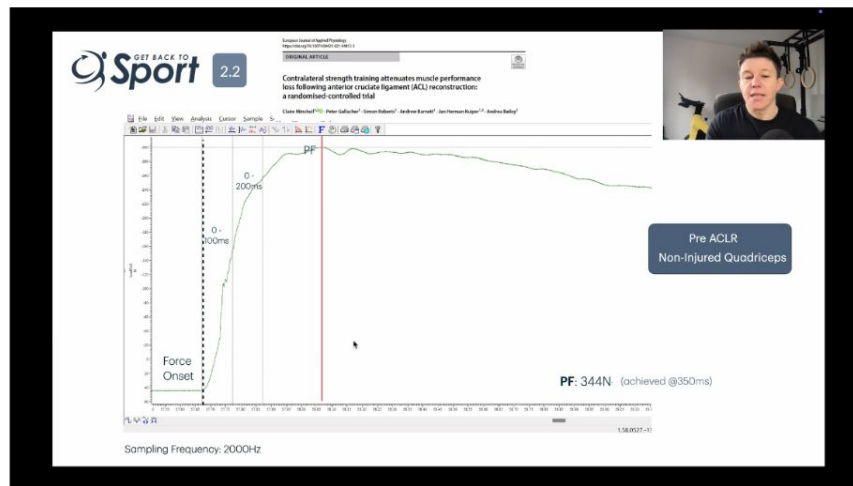
4 Lessons

4: Measurement Error & Controlling It

2.2: Peak force & rate of force development (RFD)

How To Use Dynamometry In Clinical Practice > 2: What Are We Measuring & Why? > 2.2: Peak force & rate of force dev...

IN PROGRESS



Papers & Resources



Worksheet.pdf



Worksheet.docx



Worksheet.pages



Resources.pdf

References

Suzuki et al. (2022). Rate of force development in the quadriceps of individuals with severe knee osteoarthritis: A preliminary cross-sectional study. ↗

Hannah et al. (2014). Longer Electromechanical Delay Impairs

Introduction to Dynamometry

MODULE 1

What Are We Measuring & Why?

MODULE 2

Discount: **DYNO1024**

Which Dynamometer?

MODULE 3

A detailed technical breakdown of commercially-available HHds

Measurement Error - & Controlling It

MODULE 4

getbacktosport.com

Developing Meaningful Assessments

MODULE 5

COURSE SUMMARY

Questions?



@Claire_Minshull



info@getbacktosport.com



@getbacktosport



www.getbacktosport.com