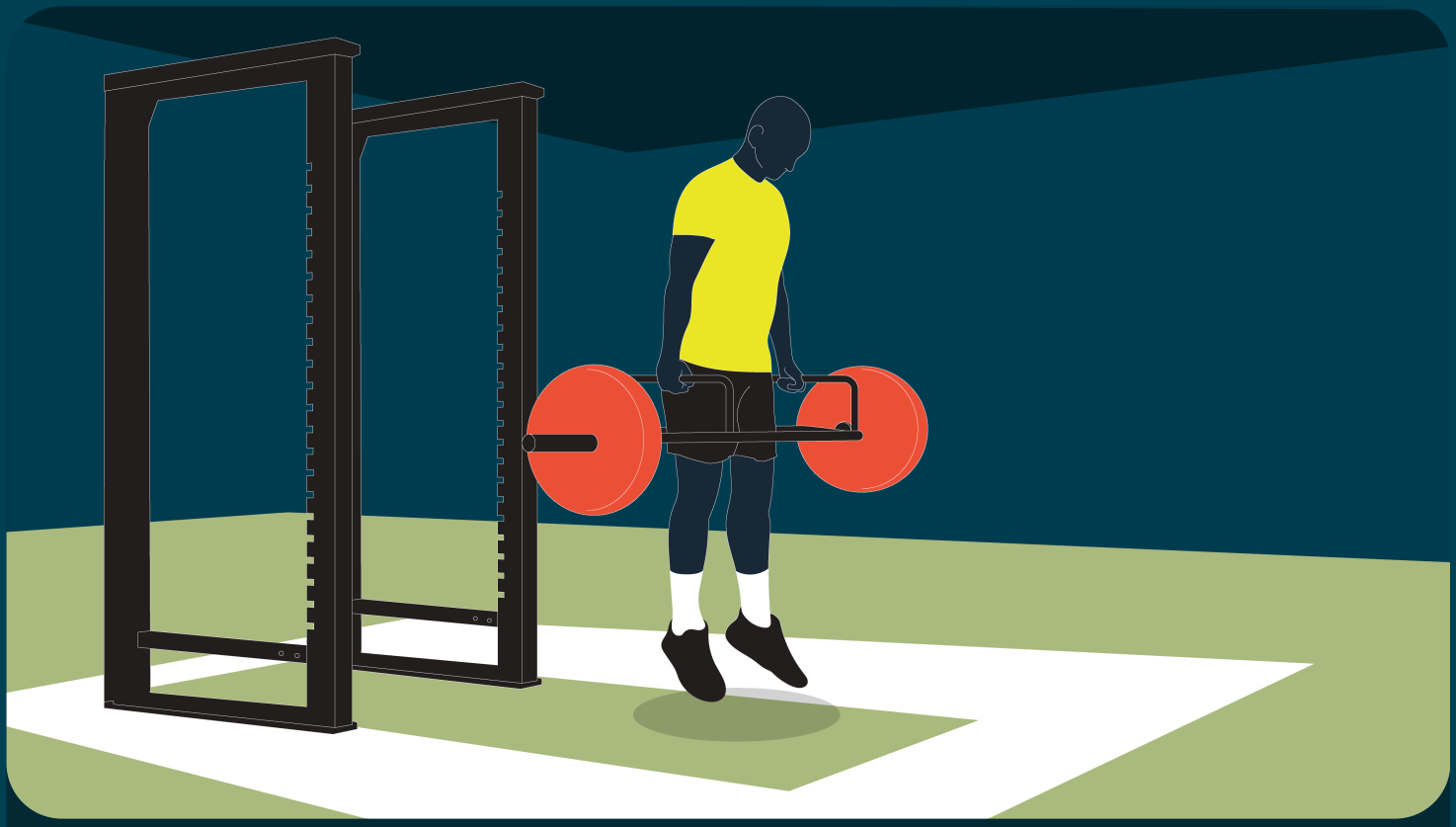
Sportsmith



FORCE PLATE PLAYBOOK MINI TOOLKIT

Adapted from Matt Jordan

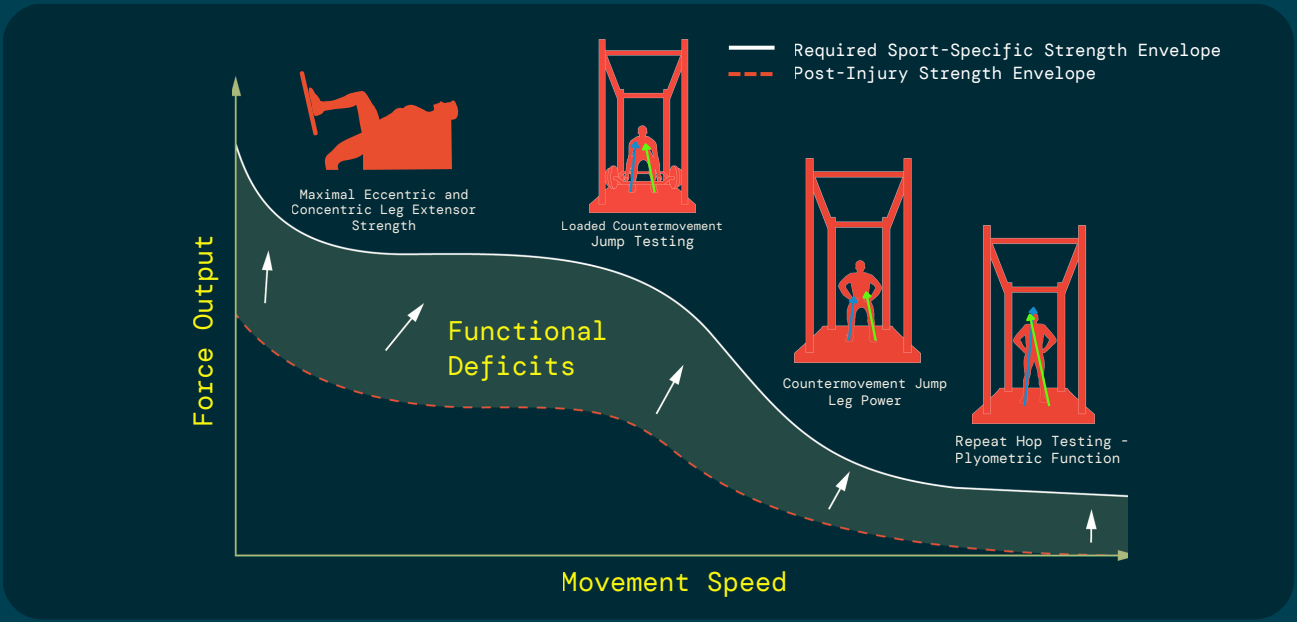
SEE PRESENTATION

What this gives you

A four-test force plate battery for ACL performance readiness. Two protocols most labs are not running, the data that shows why they matter, and a profiling framework to interpret the results

THE TESTING BATTERY

Four tests spanning the envelope of muscular strength. Each targets a different capacity. Together they give a complete picture of performance readiness that no single test can provide



The Envelope of Muscular Strength. Jordan Lab, University of Calgary.

TEST	EQUIPMENT	WHAT IT MEASURES	KEY METRICS
Robotic Leg Press	Dynamometer	Ceiling eccentric + concentric force	Peak force (N/kg), RFD
Loaded CMJ	Trap bar + force plate	Braking / eccentric capacity	Braking RFD, peak braking force
CMJ (bilateral + single leg)	Dual force plates	Concentric output, asymmetry	Jump height, power, LSI
Repeat Hop (single leg)	Force plate	Plyometric / SSC function	RSI, contact time, stiffness

"Just because you're strong doesn't mean you have plyometric function, and just because you have plyometric function doesn't mean you're strong."

- Enda King

TWO TESTS YOU'RE PROBABLY NOT RUNNING

Standard CMJ captures concentric output. These two protocols extend your force plate into eccentric strength and constrained plyometric assessment

LOADED JUMP TEST

Load:	60% of body mass
Equipment:	Trap bar + force plate
Jump:	Countermovement jump
Analyse:	Braking phase metrics Braking
Reports:	RFD, peak braking force

Braking mechanics at 60% BM show a strong relationship with ceiling eccentric strength. The additional load appears to better express this relationship than bodyweight jumping alone.

CONSTRAINED REPEAT HOP

Mode: Cue 1: Cue 2:

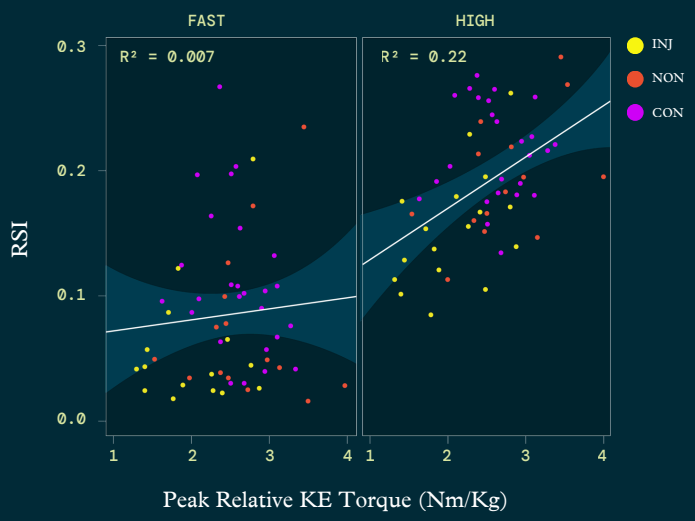
Single-leg repeat hops

1."As fast as possible" 2."Fast AND as high as possible"

Analyse:	RSI, contact time, stiffness
Compare:	Between limbs + constraints

The fast-only cue found no statistical difference between limb statuses at 10-12 months post-surgery. The fast+high cue was needed to reveal deficits, likely by demanding greater knee involvement.

CONSTRAINT	STRATEGY	JOINTS	R² vs KE TORQUE	DETECTS DEFICIT?
"Fast"	Ankle-dominant	Primarily ankle	0.007	Not in this cohort
"Fast + High"	Two-spring	Knee + ankle	0.22	Yes



RSI vs Peak Relative KE Torque. FAST (R²=0.007) vs HIGH (R²=0.22). Boone-Van Mossel.

MATCH THE CONSTRAINT TO THE JOINT OF INTEREST

Ankle injury: consider the fast cue to demand ankle stiffness regulation. Knee injury: the fast+high cue engages the knee in the plyometric action. Compare against the same constraint on the uninjured limb.

READING THE RESULTS

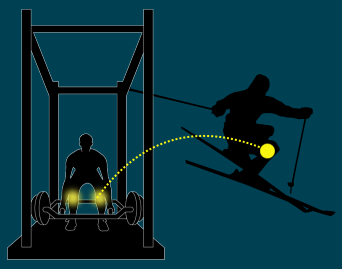
Asymmetry scores depend heavily on the benchmark you choose. And individual metrics can miss the bigger picture. Jordan's lab used machine learning to classify athletes into neuromuscular profiles and assign a probability of performance readiness.

Common Ratio Formulas

$$\text{Limb Symmetry Index (\%)} = \left(\frac{\text{Injured Limb}}{\text{Benchmark Limb}}\right) \times 100$$

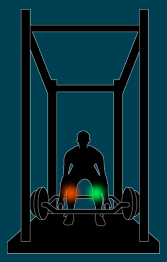
$$\text{Asymmetry Index (\%)} = \left(\frac{\text{Benchmark Limb - Injured Limb}}{\text{Benchmark Limb}}\right) \times 100$$

A.



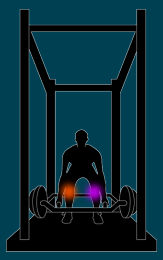
Benchmark from comparable non-injured control population.

B.



Pre-injury baseline from the injured athlete if the pre-injury capacity was sufficient.

C.



Post-injury contralateral limb but be aware of contralateral limb detraining. Track both limbs independently.

Three benchmark approaches for inter-limb asymmetry. Be wary of Option C if contralateral detraining is present.

PROFILE	STRENGTH	JH / POWER	CONTRACTION TIME	STIFFNESS	ACL INJURIES
Profile 1	Low	Low	Fast	High	2
Profile 2	Low	Low	Slow	Low	3
Profile 3	High	High	Fast	High	1

HOW TO USE THIS

1. Profile 3 represents the desirable class: strong, good jumpers, stiff, reactive. It had the fewest ACL injuries in the cohort (1 of 6).
2. A supervised ML model trained on Profile 3 assigns each ACL-injured athlete a probability of belonging to this class.
3. Below 0.5 probability suggests the athlete does not yet resemble the desirable profile. The model also isolates which variables are holding them back.
4. Example: a female basketball player from a cohort averaging 15 months post-surgery scored 0.39 probability. The model identified her specific deficits to guide programming.

"Instead of asking is a 10% or 20% or a 15% limb symmetry index good or bad, we can assign a probability that an ACL-injured athlete belongs to our desirable profile."

- Matt Jordan

Sportsmith

WANT TO GO DEEPER?

Matt Jordan's full presentation covers the complete envelope of muscular strength framework, contralateral limb detraining, machine learning profiling of neuromuscular recovery, and practical testing protocols for return-to-sport after ACL injury.

45 minutes. CEU-eligible. 1 CEU.
from £12.99/month.

Join Sportsmith Premium

PREMIUM INCLUDES

- 50+ expert presentations from leading practitioners
- Comprehensive toolkits for every presentation
- CEU-eligible content across multiple accrediting bodies
- New presentations added regularly