



# Balance, Posture and Movement

Gray Cook, MSPT, OCS, CSCS

Author of *Movement*

Founder, Functional Movement Systems

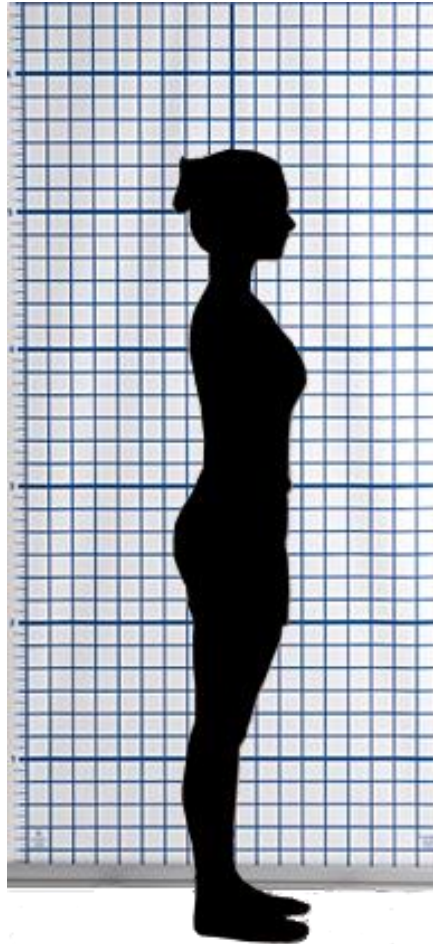
with Phil Plisky, PT, DSc, OCS, ATC, CSCS

Developer, Y Balance Test

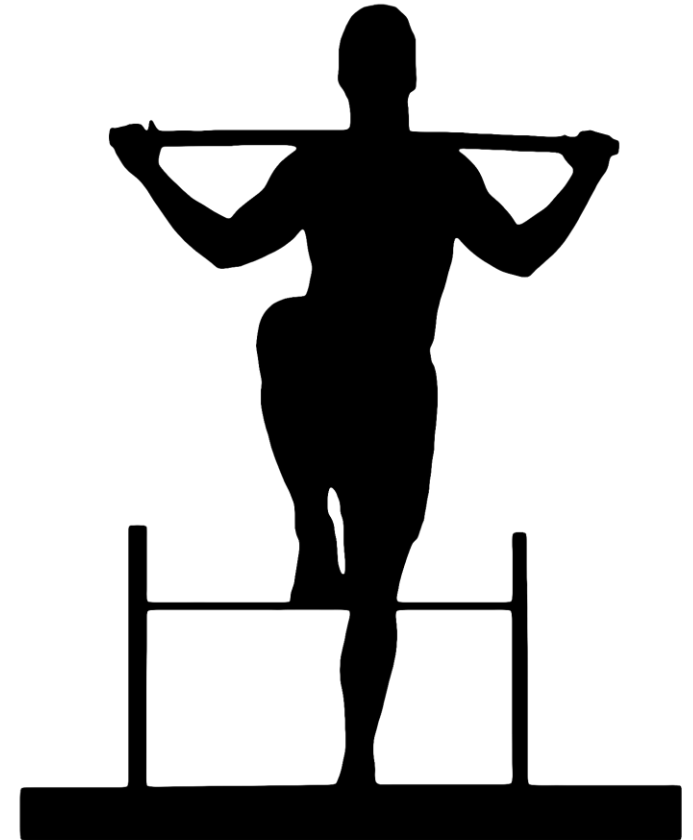
# Balance



# Posture



# Movement



# It's all Motor Control

## Motor Control:

*Necessary input, Sufficiently processed, with an acceptable output*

# It's all Motor Control

1. Necessary Input – *stimulus and sensation*
2. Sufficient Processing – *perception and planning*
3. Acceptable Output – *action (reflex – reaction)*

# 1. Necessary Input

Sensation is *required*

*What are obvious factors that can impair sensation and/or distort input?*

***Numbness/nerve conduction issues – medical problem***

***Pain – medical problem***

***Stiffness – mobility problem***

# 1. Necessary Input

Sufficient mobility is a requirement for the necessary input for Motor Control . . .

*Stiffness lowers input*



*That's why the FMS has a mobility bias*

## 2. Sufficient Processing

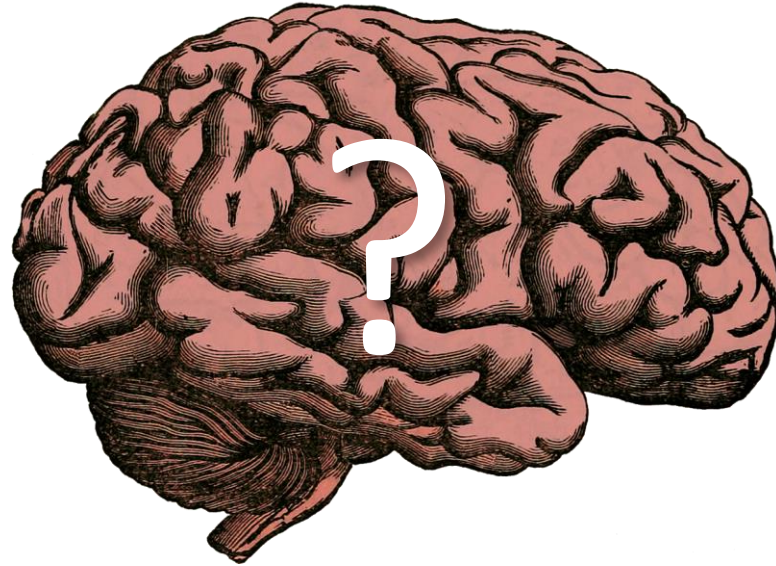
How do you test for sufficient processing?



Testing **dysfunctional** processing ability is a low percentage play  
... *without a medical history that tells you otherwise (**disabled**)*.

## 2. Sufficient Processing

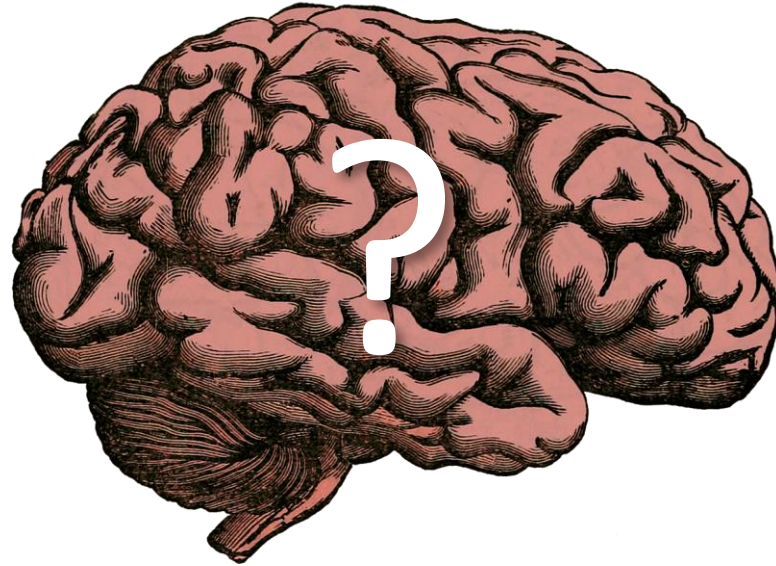
How do you test for sufficient processing?



This is where **compensation** lives – whether it is necessary or no longer necessary.

## 2. Sufficient Processing

How do you test for sufficient processing?



Manage **compensation** by finding the developmental level where it is not necessary.



## 2. Sufficient Processing



Simple to complex motor control requirements within the FMS help you find that developmental level.

# 3. Acceptable Output

Minimum movement pattern function without pain.

**Movement Literacy:** *The ability to read and write basic movement patterns that allow interaction with the environment and adaptation to environmental demands.*

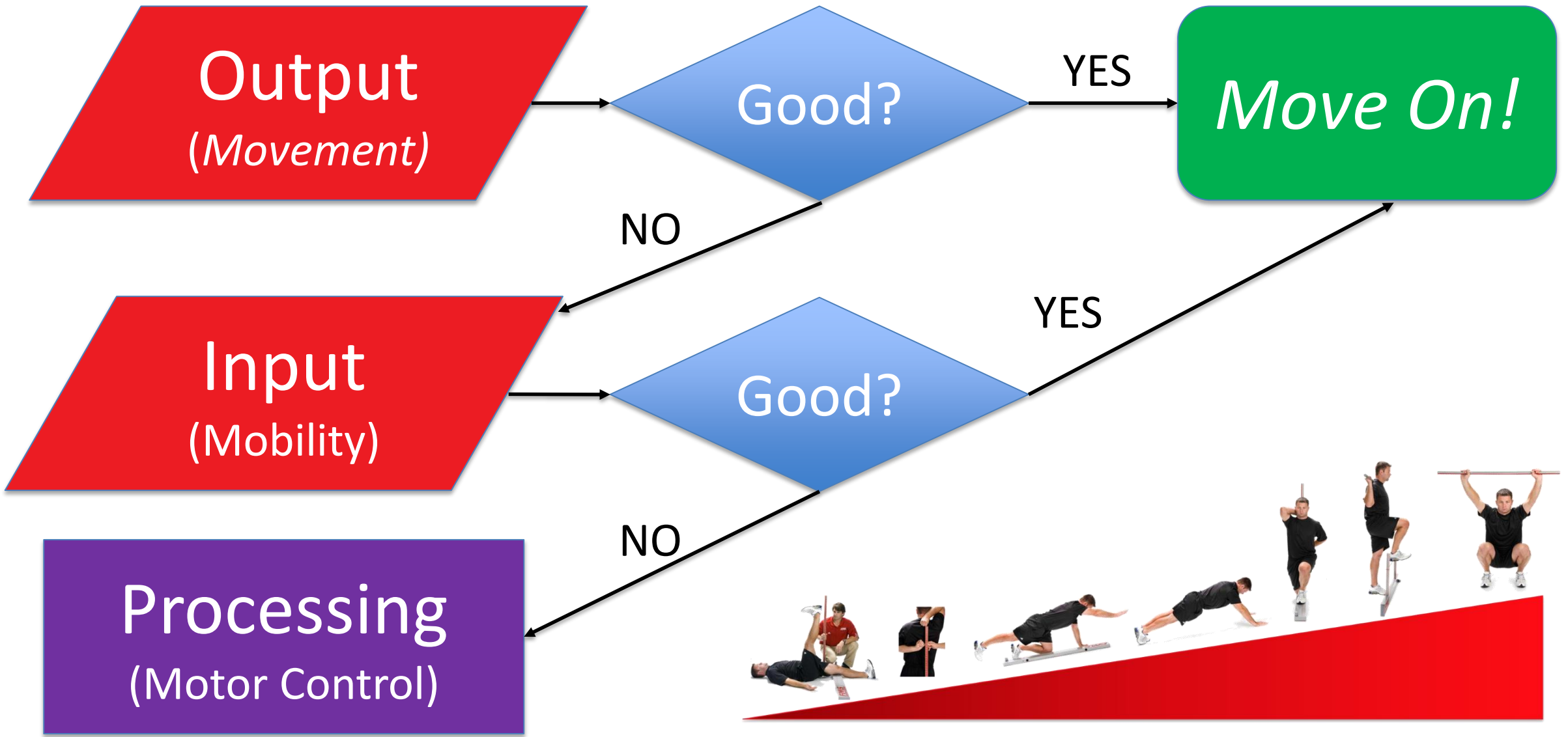
### 3. Acceptable Output

If you agree on the three basic criteria for Motor Control,  
*which is the easiest to check?*

Input

Processing

Output - *Movement Literacy*



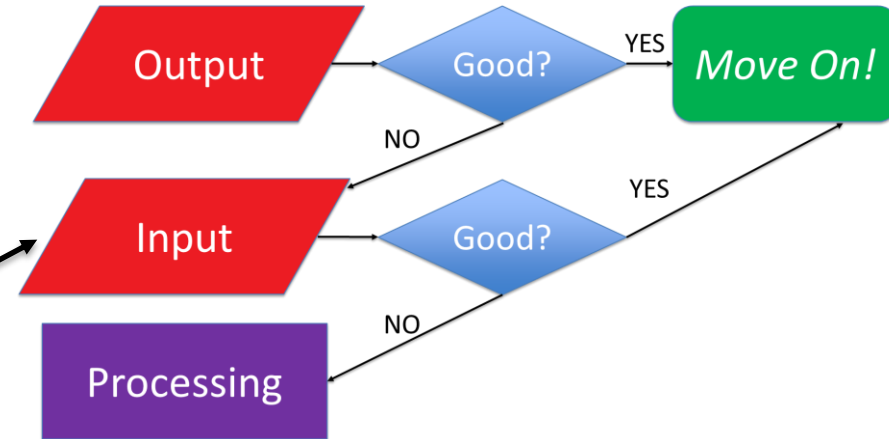
# Dysfunctional Movement

To determine if we should investigate a Motor Control problem, we must look at **Input** and **Processing**

*It's either:*

**A mobility problem . . . or**

**A motor control problem**



# 3. Acceptable Output

**Don't think total score!**

**Functional movement (FMS 2s and 3s only)**

basic Motor Control – move to fitness and performance testing

**Dysfunctional movement (FMS 1)**

correction – focus on mobility and stability issues within '1' pattern

**Movement health problem (FMS 0)**

assess for diagnosis in the '0' pattern





# Dysfunctional Movement

1/1 Leg Raise



**Think  
Mobility!**

1/1 Shoulder Mobility



2s on everything else



# Refine the Mobility Problem

If mobility is determined to be good through the first **FMS correctives** or **ROM measurements** . . .



Consider it a processing problem . . .

In the industry, we call this a **stability problem**



# Dysfunctional Movement

3/3 Leg Raise



**Think  
Motor Control!**

3/3 Shoulder Mobility



2s on everything else



# Refine the Stability (Motor Control) Problems

*Common causes of compensation and poor processing:*

- 1. Sedentary / Deconditioned state, but otherwise normal**
- 2. Previous injury / Instability / Structural deformity**
- 3. Predisposition to Hypermobility**

*For each of these, knowledge of **history** is important*

# Refine the Stability (Motor Control) Problems

1. Sedentary / Deconditioned state, but otherwise normal  
*Should respond quickly to corrective programming.*
2. Previous injury / Instability / Structural deformity  
*Specific (one joint). May not respond quickly.*
3. Predisposition to Hypermobility  
*May not respond quickly.*

# Refine the Stability (Motor Control) Problems

2. Previous injury / Instability / Structural deformity

*Refer to healthcare provider*



# Refine the Stability (Motor Control) Problems

## 3. Predisposition to Hypermobility

*You can test using the  
Beighton Criteria and  
Brighton Criteria*



+ Joint pain  
+ Frequent dislocations  
*(among other criteria)*

# Beighton Test

**One point** if you can place your palms on the ground while standing with your legs straight



# Beighton Test

**One point** for each elbow that bends backwards



# Beighton Test

**One point** for each knee that bends backwards



# Beighton Test

**One point** for each thumb that touches the forearm when bent backwards



# Beighton Test

**One point** for each little finger that bends backwards 90 degrees or beyond



# Beighton Test

**What's your score?**



score of four or more (either now or in the past) and/or joint pain for longer than three months in four or more joints?

***You may be hypermobile. . .***

# Hypermobility

If you are in this category, you demonstrate good basic function on the **FMS**, however your hypermobility may complicate exercise progress with load and impact.

The **Y Balance Test** will tell you if your extra mobility has created a Motor Control problem.

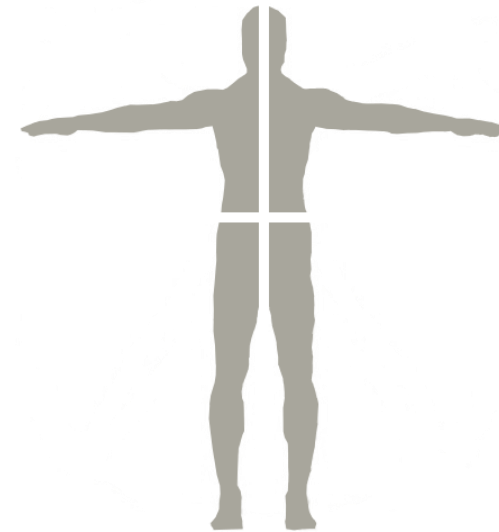




Thoroughly-researched, user-friendly Motor Control test

Demonstrates functional symmetry

Quarters the body and looks at  
core and extremity function  
under bodyweight loads



## *YBT Lower Quarter (YBT-LQ)*

*Maintain single-limb stance while reaching as far as possible with the contralateral leg. Measurement is body-relative.*



*Anterior*



*Posteromedial*



*Posterolateral*

## YBT Upper Quarter (YBT-UQ)

*From push-up position, reach in the medial, inferolateral and superolateral directions. Measurement is body-relative.*



*Medial*



*Inferolateral*



*Superolateral*



1. Sedentary / Deconditioned state, but otherwise normal  
*Should respond quickly to corrective programming.*
2. Previous injury / Dislocation / Structural deformity  
*Specific (one joint). May not respond quickly.*
3. Predisposition to Hypermobility  
*May not respond quickly.*

With the FMS, we've been looking at **Movement Health:**

- Having sufficient structure and function to not require medical treatment.
- *Potential Function*

Symmetrical 2s and 3s represent **Movement Function:**

- The ability to survive and develop in a given environment
- *Demonstrated Function*

The YBT demonstrates **Motor Control** and **Functional Symmetry**

- *We feel it is the linchpin between **functional movement** and **fundamental performance***

From this foundation of

**Movement Health**



**Movement Function**

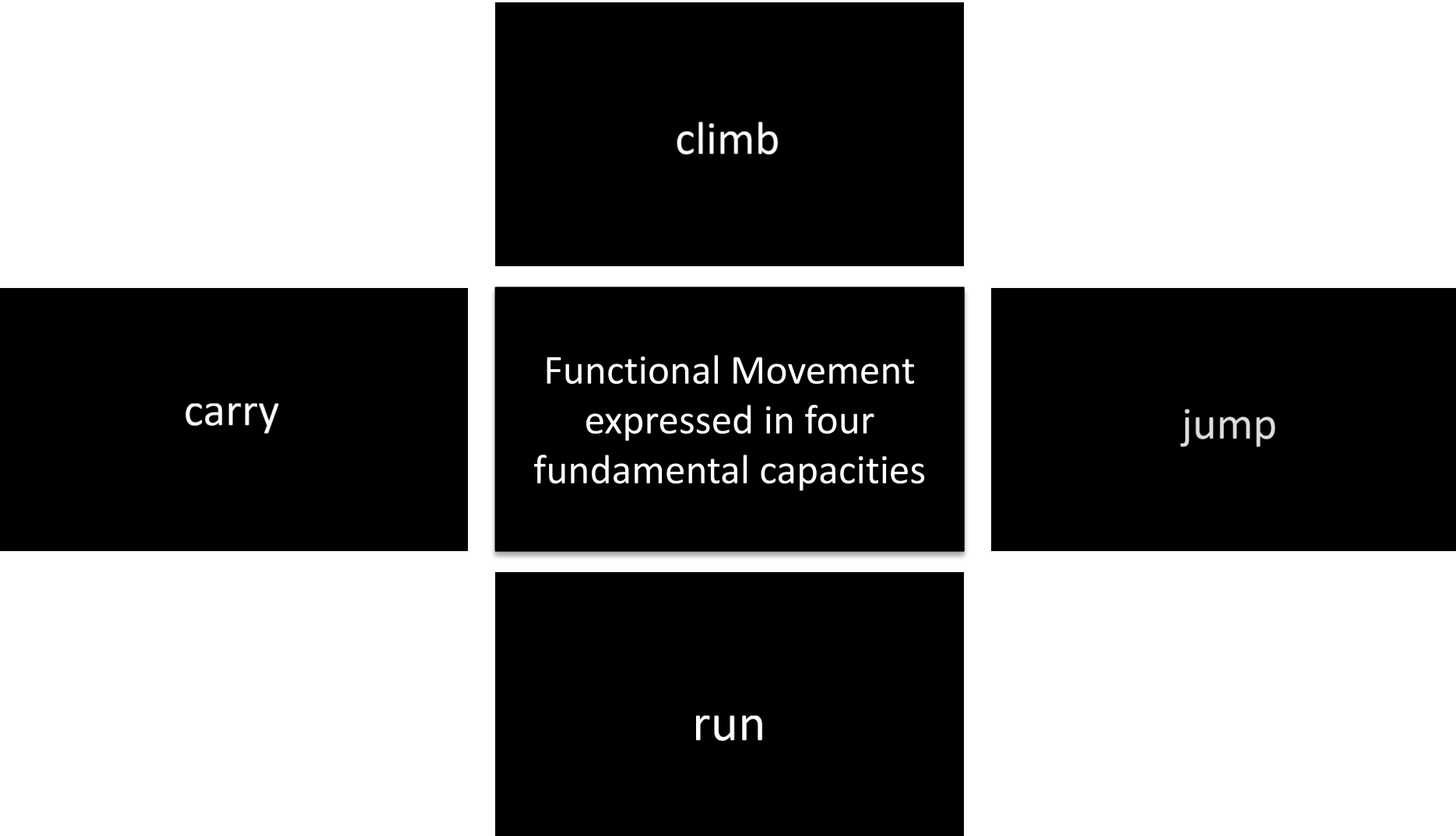


**Movement Symmetry**



We can look at **Fundamental Capacity:**

- Irreducible physical qualities that are not sport/activity-specific and are possessed at a young age.
- By mapping these qualities, issues can be addressed prior to optimizing specific skill development.





Functional Movement  
expressed in four  
fundamental capacities



Using these principles,  
the **Fundamental Capacity Screen** will consider  
four irreducible movement capacities:

**Movement Control** (Motor Control)

**Postural Control** (Integrity)

**Explosive Control** (Power)

**Impact Control** (Efficiency)

***Are these capacities part of our DNA?***

# Movement Control

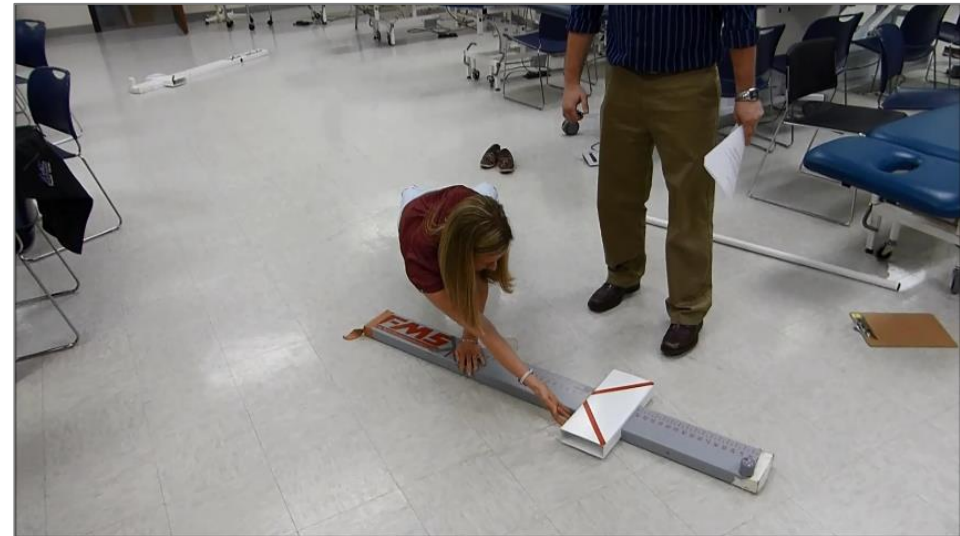
- The ability to manage postures and patterns vital to successful adaptation to the environment,
- In the developmental model, we look at the infant's ability to **crawl and climb**.
- These forms of advancement are based on **single-limb competency**.



# Movement Control

## Motor Control Screen

- Determines motor control capacity of bodyweight with minimal/no use of stored, kinetic energy
- Based on research behind Y Balance Test (LQ and UQ)



# Postural Control

- The ability to manage postures and patterns with force to support loads over distances required by the environment,
- Developing toddlers have a strong desire to carry things that they value,
- Lifts can be looked at as the beginning and end of the carry pattern,
- In survival situations, there is more carrying than lifting,
- We must be able to maintain integrity under load before we can move under load. (brake analogy)



# Postural Control

## Carry Screen

- Used as a biomarker for heavy carry work capacity
- Determine if the individual can maintain alignment with integrity under load to allow maximum adaptability.



# Explosive Control

- A fundamental expression of human motor control and work expressed within time constraints,
- First expressed when a toddler confronts the constraints of gravity = constant feedback,
- Jumping is a natural exploration of this power.



# Explosive Control

## Jump Screen

- Broad jump (with and w/o arms) as a biomarker for power capacity
- Determine if the individual minimum level of power with bodyweight to allow maximum adaptability.



# Impact Control

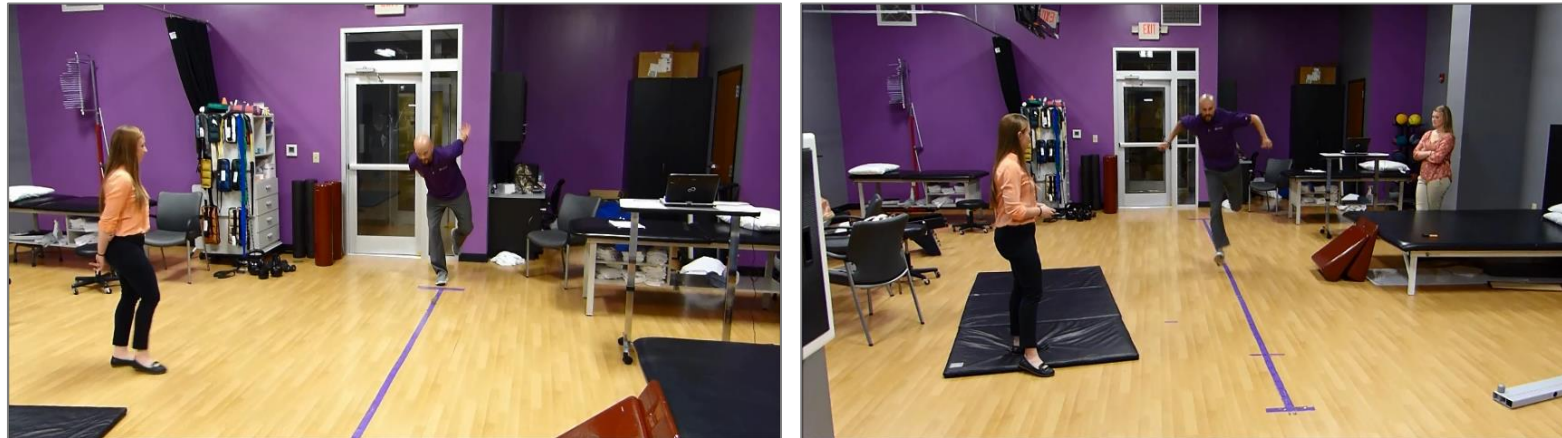
- This is **Energy Storing** or **Recycled Energy**,
- Power recycled for efficiency,
- In running, hopping and skipping, toddlers naturally learn to store some of the energy expressed through their power,
- They intuitively learn to recycle a portion of that energy.



# Impact Control

## Hop Screen

- Single Hop and Triple Hop as biomarkers for energy-storing capacity
- Determine if the individual is able to use stored kinetic energy and the CNS to create a maximal return on energy, enabling maximum adaptability.

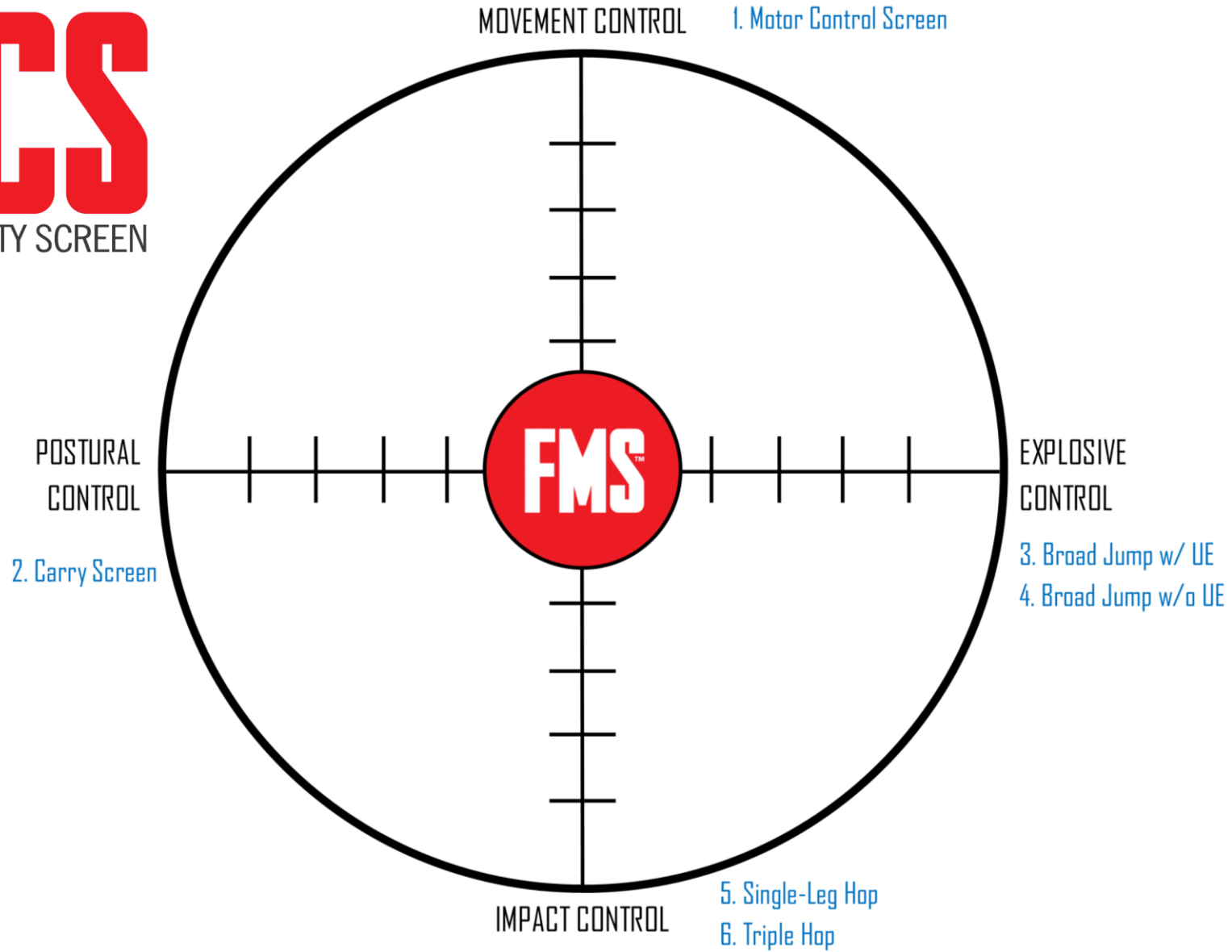


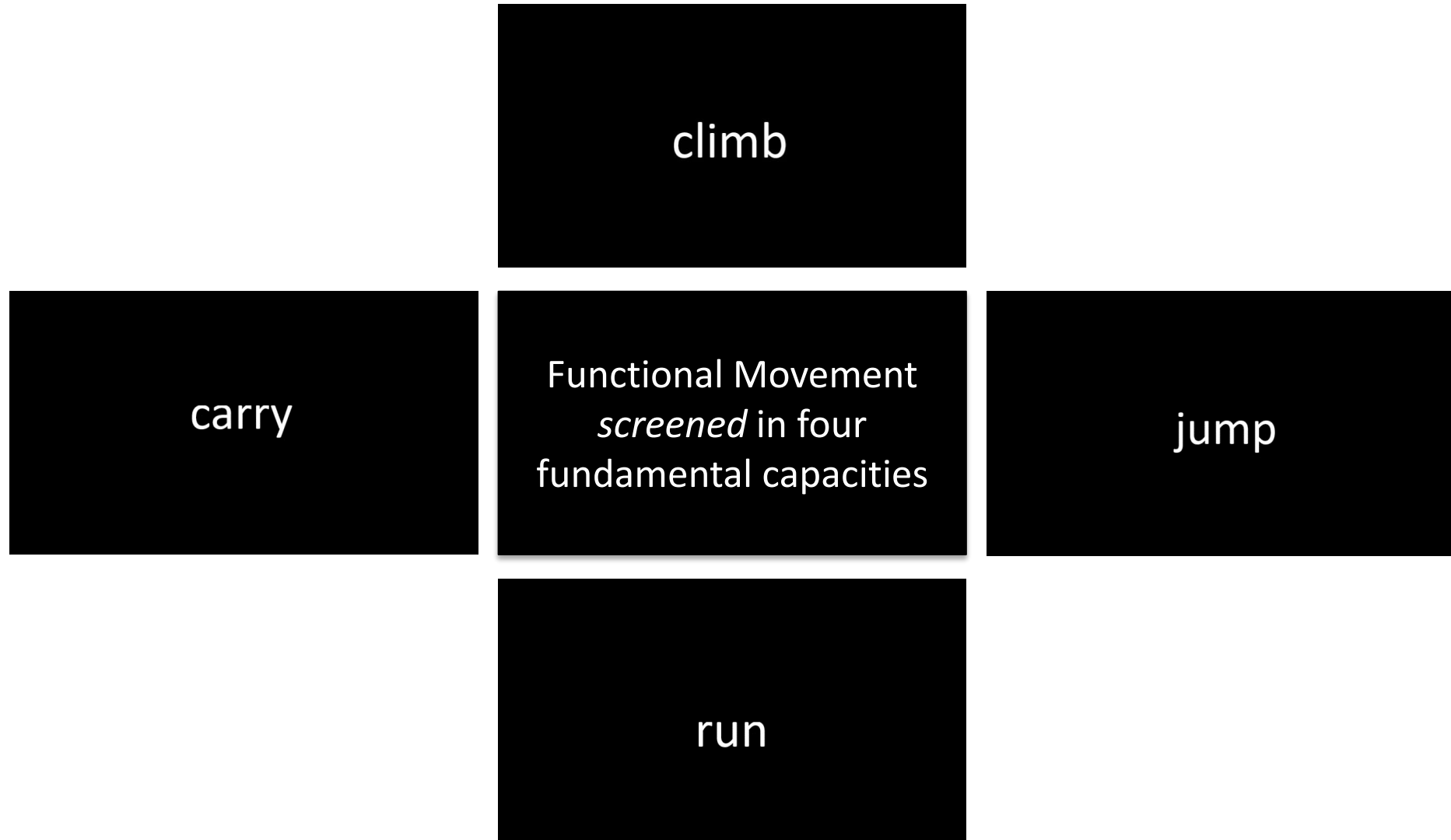
# **Movement Control**

## **Postural Control**

## **Explosive Control**

## **Impact Control**





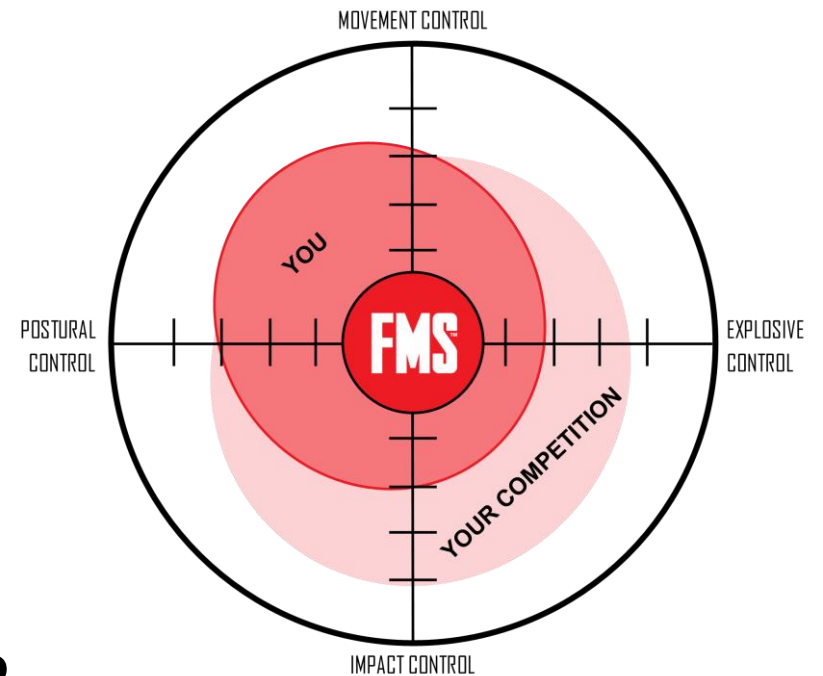


Functional Movement  
*screened* in four  
fundamental capacities



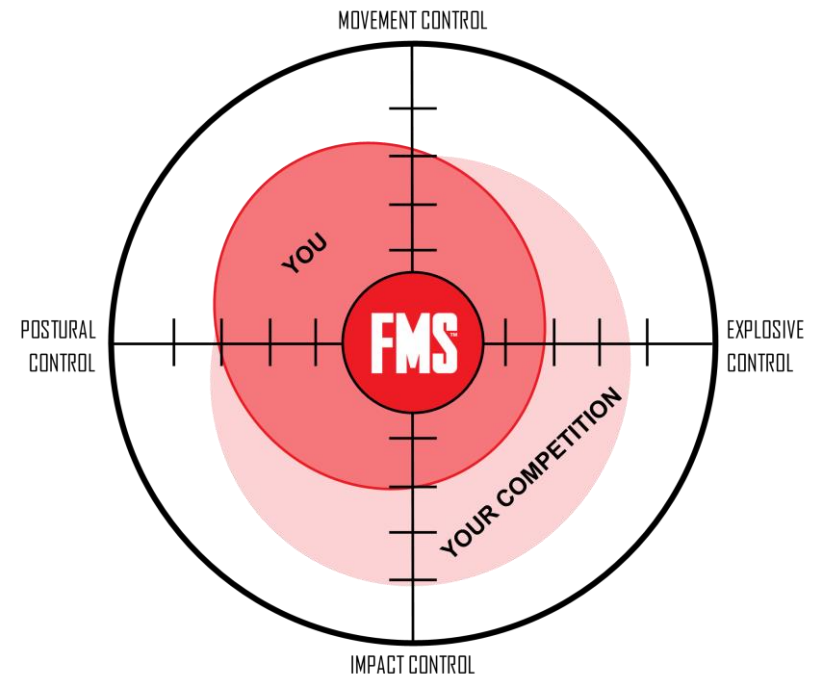
# Movement Compass

- When screens have been performed, results can be plotted using the movement qualities as the four points,
- It becomes easy to see a deficiency in a particular movement quality and focus programming accordingly
- **Is there a sufficient base for the desired skill?**



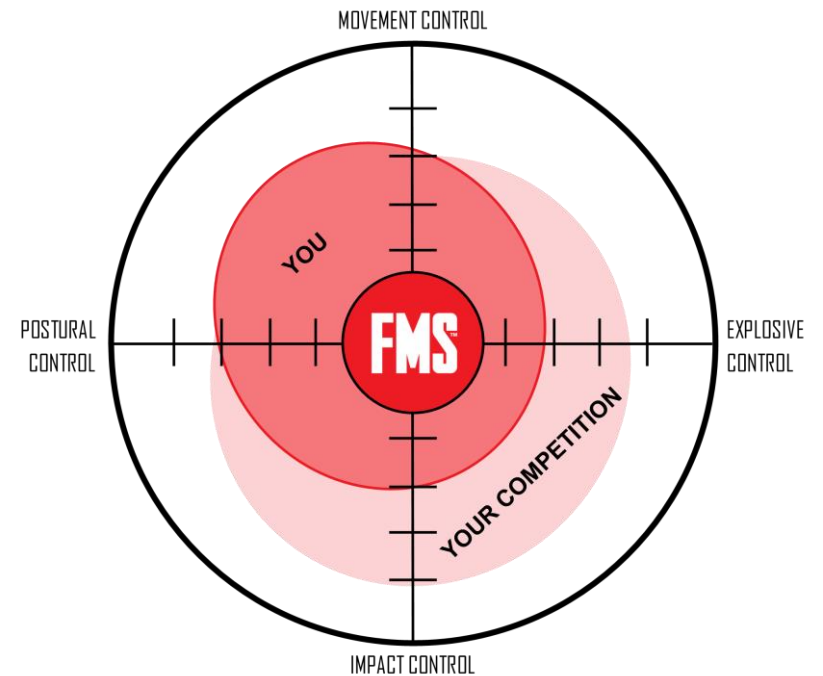
# Movement Compass

- Using data from individuals we can plot the movement qualities for specific groups, sports and occupations,
- Does your plot match the **minimum required resources** for the group you wish to be in?
- Meeting minimums is more important than single superlatives.



# Movement Compass – *Skill Training Implications*

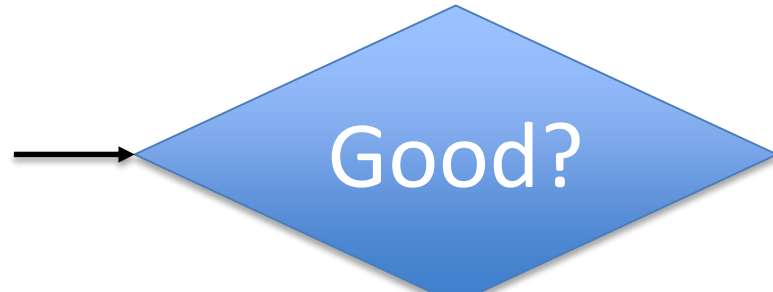
- Fundamental Movement Capacities are raw physical **resources** that an individual draws from,
- Athletic or performance skill demonstrates an individual's **resourcefulness** with those resources.
- Demonstrates if sport-specific training is advantageous over general training



SPECIFIC  
SKILL TESTING

FUNDAMENTAL CAPACITY  
SCREEN

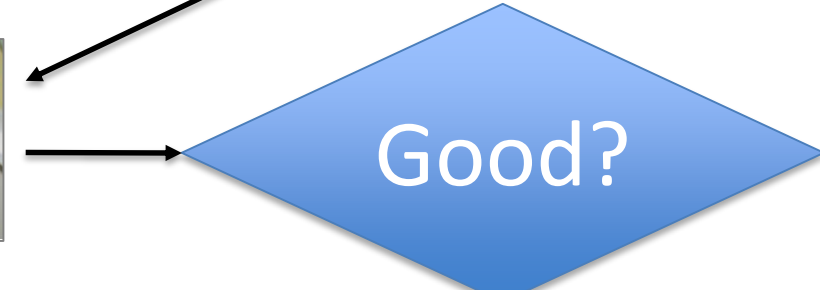
FUNCTIONAL MOVEMENT SCREEN



YES

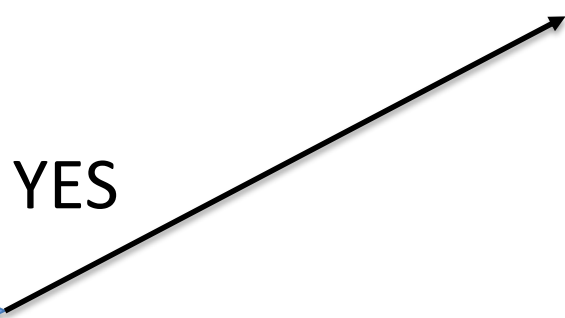


NO



YES

NO



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