Optimizing Performance through Integrated Practice Interventions

Using Session Components as Movement Grids for Functional Performance Analysis

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Purpose of Discussion

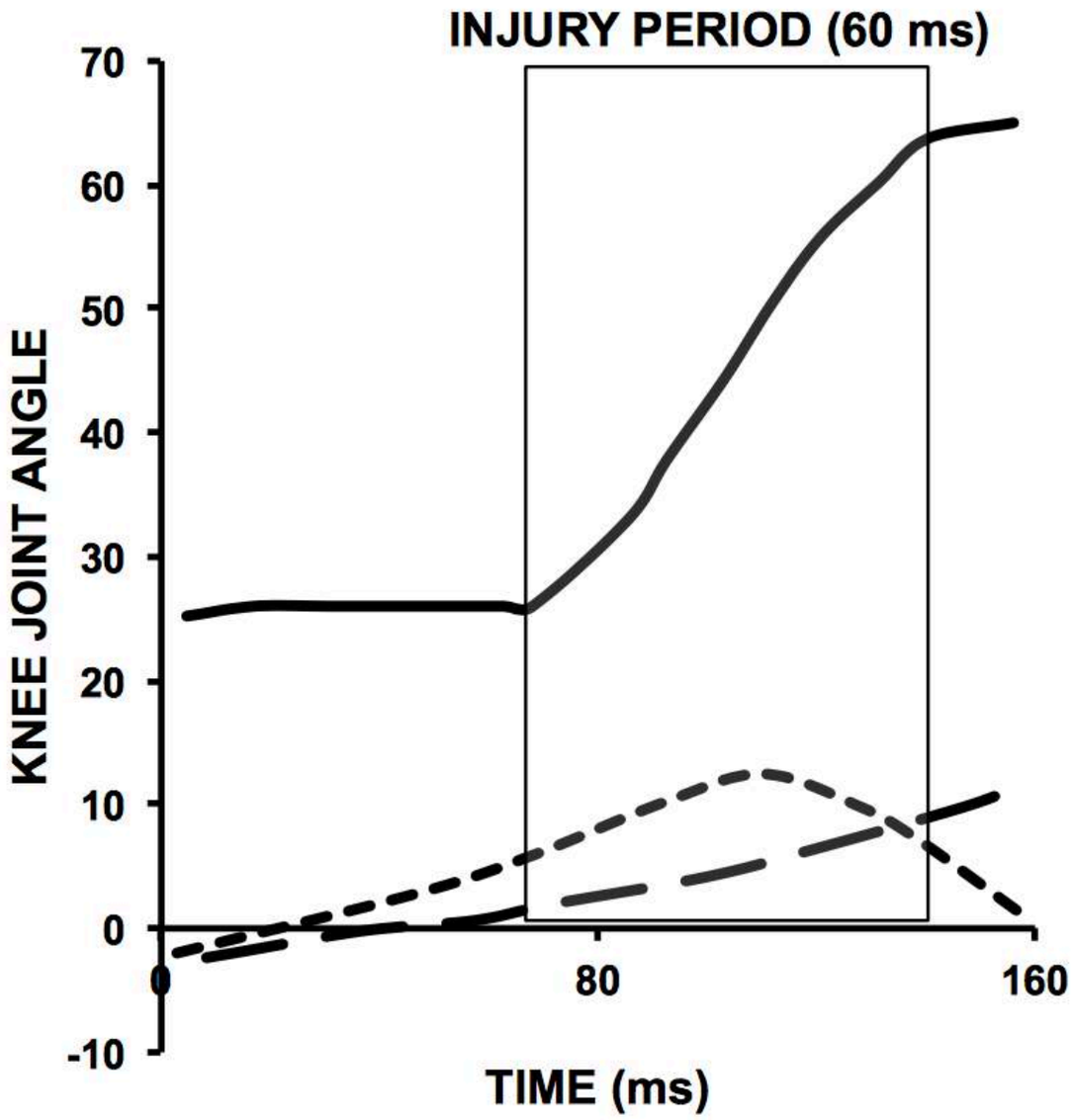
- Become a better coach, athlete and or practitioner
- Become a better consumer of sports medicine services
- Improve communication among athletes, coaches and performance service providers
- Improve understanding of kinesiological factors for wellness
- Improve work quality and capacities
- Reduce acute and chronic injury occurrences
- Reduce lost man hours and competition absences
- Improve coach/athlete reporting skills

The Big Rock-Return to Play

- Acute Rehab, Transitional Training and Real Time, Real World Demands
- Component analysis of sessions and games to build final testing of readiness is critical
- Cognitive/Perceptional tasks are late stage but critical factors of analysis

Ergonomics of Injury

SLIP AND CATCH MECHANISM

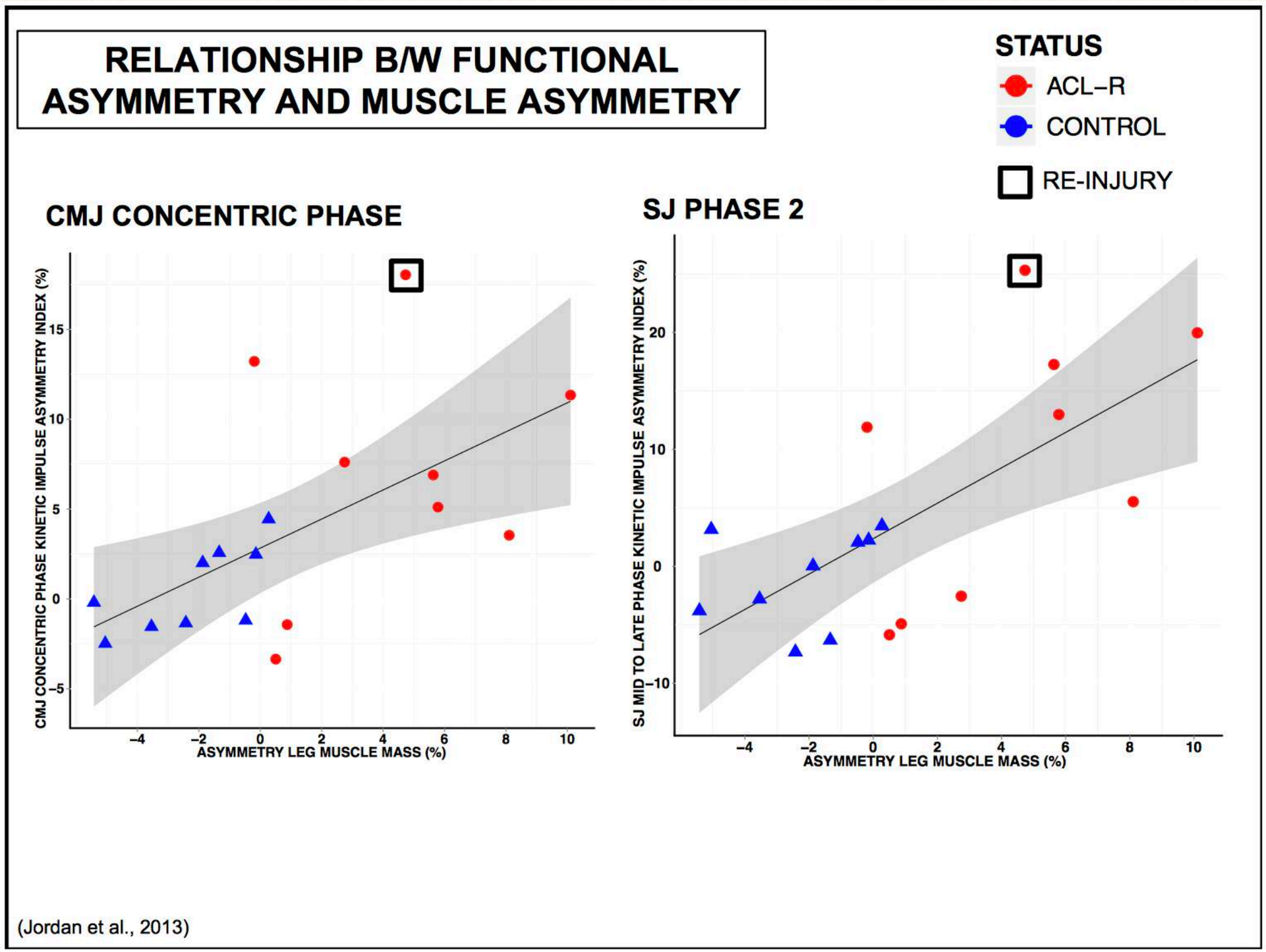


- Knee Flexion
- Valgus
- Internal Rotation

- Rapid increase in knee flexion 26° to 63°

Barone et al. *Skiing Trauma and Safety, 12th Edition* (1999): 63-81.
Bere et al. *The American journal of sports medicine* 41.5 (2013): 1067-1073.

In the Trenches



(Jordan et al., 2013)

The Big 4, Factors for Influencing Athlete Wellness

- Programming
- Lifestyle
- Biomechanics
- Medical Interventions

Programming

- Injury History
- Mechanical Skillsets
- Asymmetries
- Sport Tasks
- KPI Identification and Hierarchy Development
- Fluidity of Programming
- Communication and Reporting
- Analysis Tools
- Integration with Staff Demands
- Education of Principles

Lifestyle Factors

- Sleep Hygiene
- Diet, Nutrition and Hydration Skills
- Time Management
- Mental Resilience Skills
- Life Management
- Coping Skills

Biomechanics

- General Contextual Abilities
- Event Specific Skillsets
- Compensation Abilities and Tipping Points
- Fatigue Influences
- Menu Item Accountability Systems

Sports Medicine Input Factors

- Screening and Analysis of Findings
- Tools for Correction
- Communication and Network Influences
- Myths and Biased Scientific Studies
- Data Collection on Intervention Methods

Movement Screens or Grids

- Coaches have been using this concept for centuries, its called watching practice intently.
- Every item on the training schedule is a movement screen
- One must train the eye to see using landmarks, planes, axes and angles.
- Seeing in real time is built upon video and photo review skills.
- Chaos theory and fractal patterns

Have a Biomechanical Sound Model: For All Sporting Movements and Activities

Athletes have positive and negative movement strategies built upon experiences, injuries and misconceptions!

- Leverage variables to gain speed
- Use lever and axes systems
- Apply Joint and muscle timing systems, alarm theory
- Sense Momentum factors
- Crave Speed of movement
- Manipulate Support Phases to influence postures
- Reveal issues during Flight Phases
- Pathways of limbs and athlete's C of G never lie

Warning!! On Models and Methods

- Beware of conformational bias
- Utilize deep study of new trends and reports
- Sample diverse practitioners and projects
- Realize some of the classics and old guys weren't that far off
- Beware of marketing and internet **gurus**
- Be careful with inferences

Motor Learning, Kinesiology and Biomechanics

Motor learning is a change, resulting from practice or a novel experience, in the capability for responding. It often involves improving the smoothness and accuracy of movements.

Biomechanics is the movement science field that applies the laws of mechanics and physics to human performance, in order to **gain a greater understanding** of performance in movement events through modeling, simulation and measurement.

Kinesiology is the science dealing with the interrelationship of the physiological processes and anatomy of the human body with respect to movement.

They are not one and the same!

Perceptional Grids for Analysis

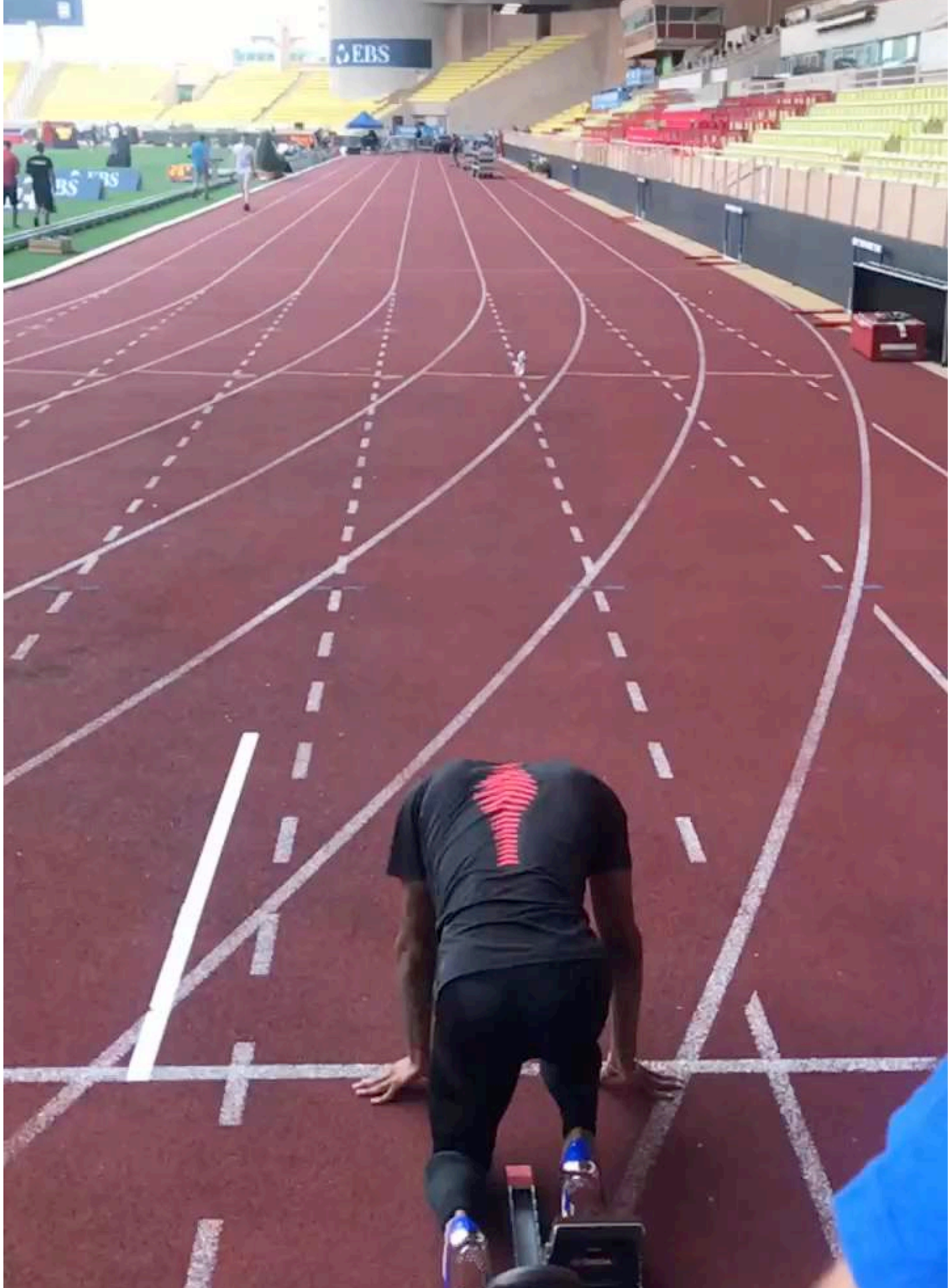
- Range of Movement
- Speed of Movement
- Joint Sequencing
- Reactiveness
- Sequencing of Gross Movements
- Sequencing of Fine Movements
- Postures of Key Support Mechanisms
- Symmetries
- Aberrations
- Readiness/Body Language
- Perspective of Observation
- Axes of Rotation (Longitudinal, transverse)
- Contact/Flight time relationships

Seeing Motion

- In real time
- Still photos
- Sequence photos
- Stop action
- Varied speed
- Reverse action
- Perspectives: frontal, rear, panning, above

The Power of Perspective

REAR VIEW, 300 frames per second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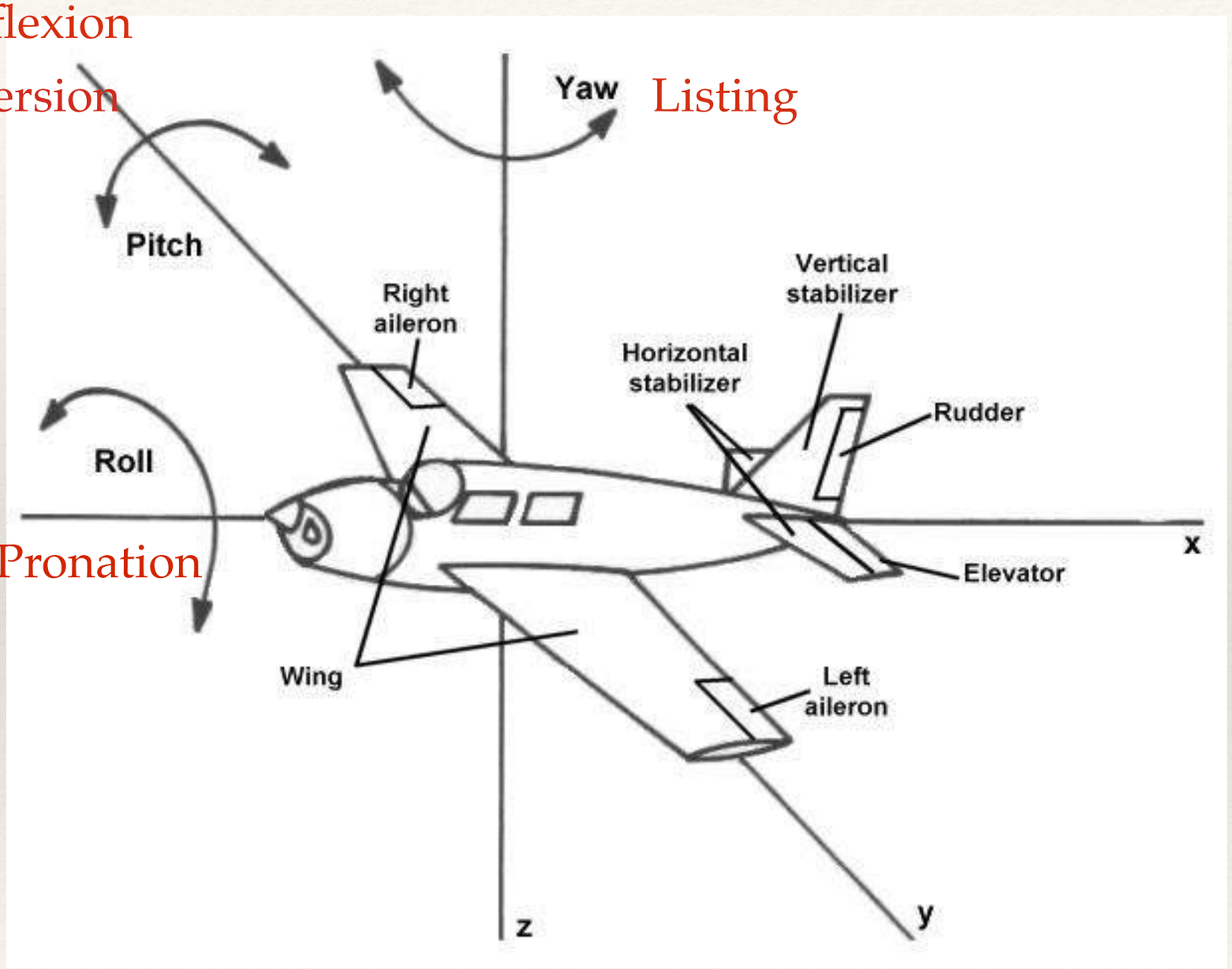
Axes Analysis Tools

Plantar and Dorsiflexion

Hip Ante/Retroversion

Listing

Supination and Pronation



Vectors, Angles and Projection Angles

Interventions

- Mobility Exercises
- Prescribed Flexibility or Fascial Exercises
- Activation Exercises
- Soft Tissue Manipulation
- Joint Manipulation
- Acupuncture
- Recue correct themes or movements
- Plan B
- Plan C
- Cessation of session
- Refinement of Long Term Rehab/Pre-hab Strategies

The Warmup

Warmup A: Jog, skip 400-800m; Eldoa Exercises; Sprint Drills; Dynamic Flexibility Drills; Acceleration Runs

Sprint Drills:

A-Skip

B-Skip

Backward Skip

Backward Walk

Lateral Shuffle

Cross Overs

Carioka

Butt Kicks

Dribble Ankle

Dribble Calf

Dribble Knee

Straight Leg Scissor

Flex Leg Scissor

High Knee

Fast Leg A

Fast Leg B

A Skip, frontal and pan

B Skip, frontal and pan

B Skip, pan

Backward Skip, rear and pan

Backward Walk, pan

Ankle Dribble, pan

Ankle Dribble, rear

Dribble Calf, frontal

Calf Dribble, pan

Dribble Knee, pan

Dribble, Knee, rear

Butt Kick, frontal and pan

Butt Kick, rear view

Straight Leg Scissor, rear view

Straight Leg Scissor, pan

Straight Leg Scissor, frontal

Flex Leg Scissor, pan

Flex Leg Scissor, rear view

Fast Leg A, frontal

Fast Leg A, rear

Fast Leg B, rear

Fast Leg, B pan

Cross Over, frontal

Cross Over, side view

Side Shuffle, pan

Carioka, side view

Accel, pan view

Dynamic Flexibility Exercises

- Multi-planer
- Less gravitational effects
- Minimal ground translation

Eagles, supine

Eagles, prone

Leg Whip

Leg Swings, frontal plane

Leg Swings, Sagittal plane

Inverted Scissors, Saggital

Inverted Scissors, Frontal

Hurdle Trail Leg

Hip Circles

Plyometrics

Skip for Height, with Load

Double/Alternate Leg, with Load

DL Backwards, with Load

SL Medial, with Load

SL Forward, with Load

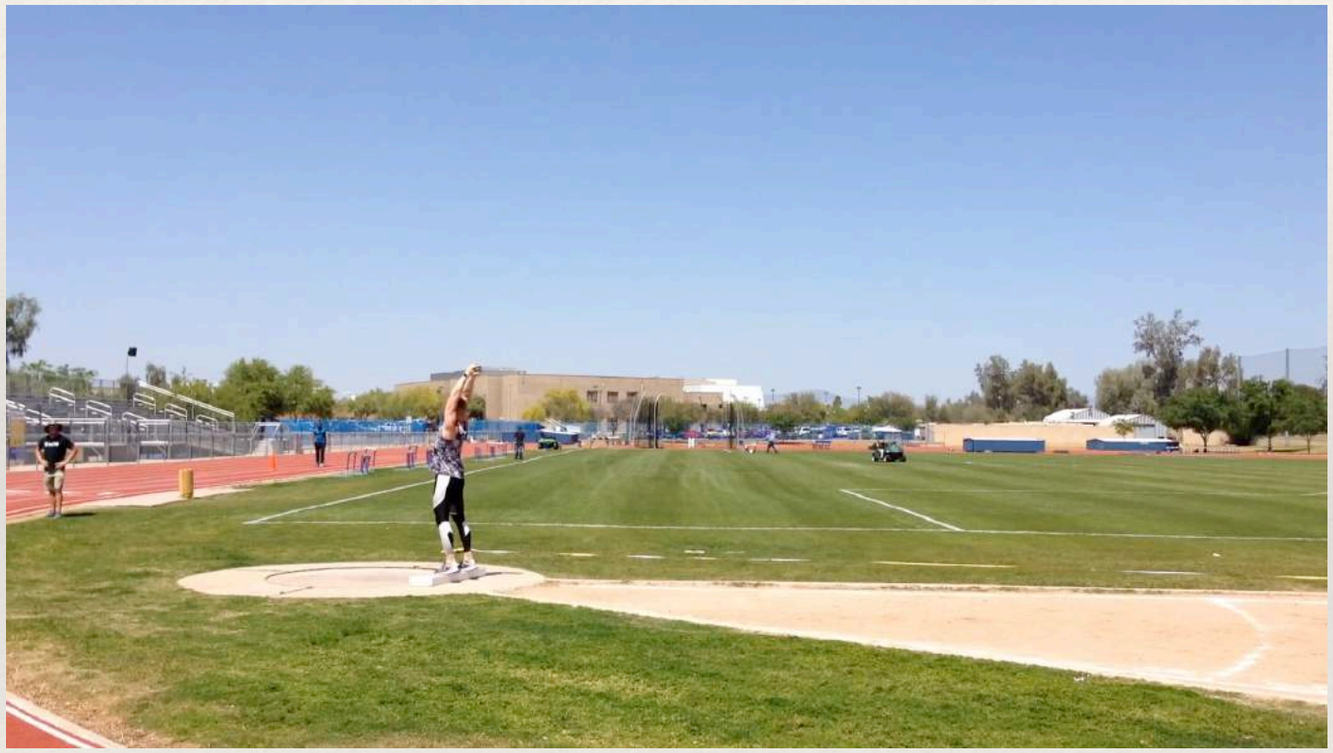
Hurdle Hops, Medium Vertical and Horizontal Challenge

3 DL Bounds

Alternate Leg Combo

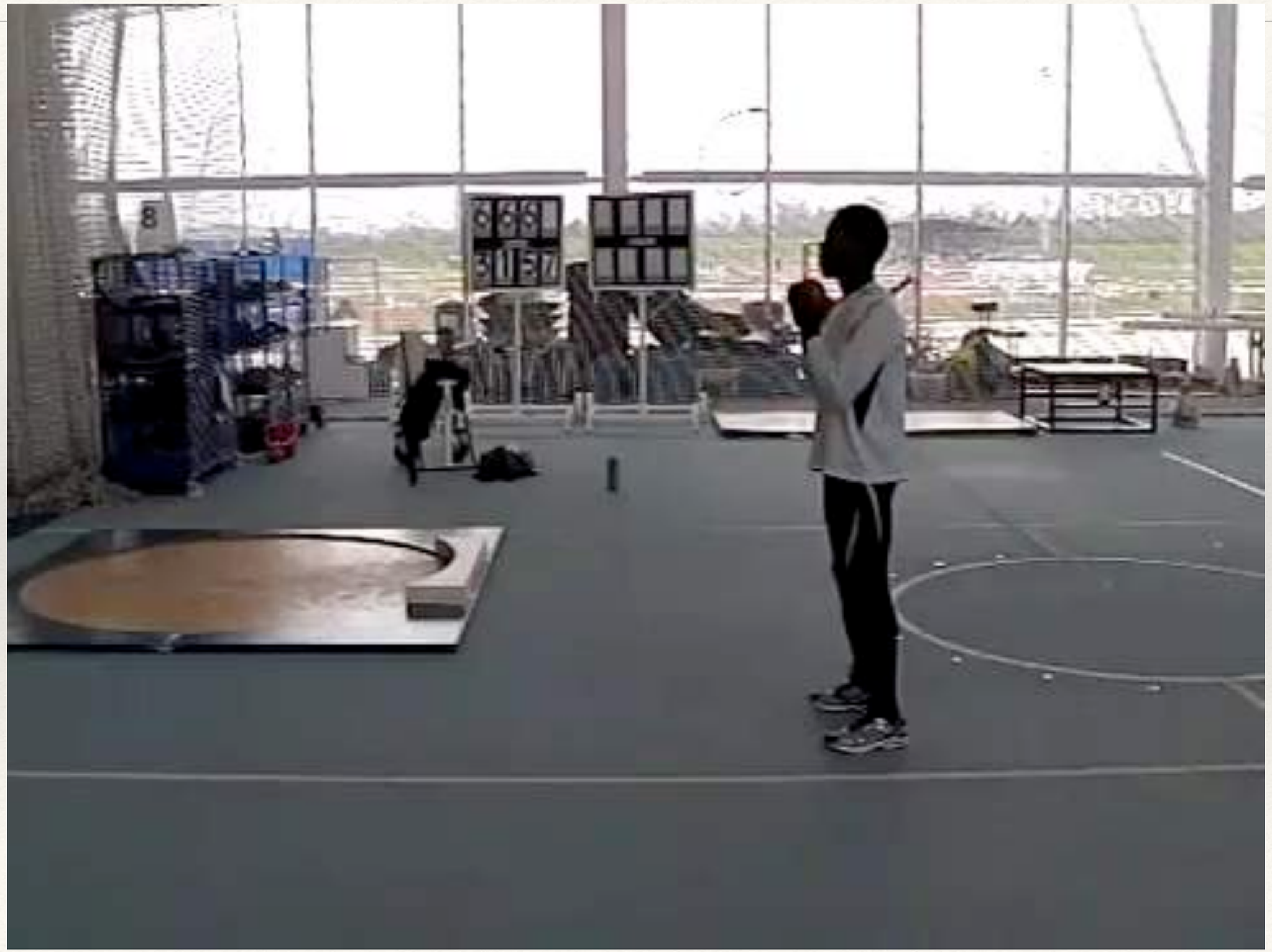
Standing LJ

OHB



Multiple Throws

1 Hop w/OHB



1 Hop, BLF

Weight Room Exercises