



“Assessment & Injury Prevention”

Jeff Cubos



“Comprehensive Stability”*

Jeff Cubos



“What’s Worked for Me”

Jeff Cubos





“Durability is More Important than Ability”

“Rehab is just an extension of purposeful training”

Boo Schexnayder

Boo

***“PREhab and INJURY
PREVENTION are just
extensions of purposeful training”***



Who's at Risk?

- Back Pain Prevalence
 - 30-40% per year
 - 85% lifetime
- Lost work & disability
- Cost of treatment





"Back injuries will resolve on their own in 4-6 weeks"

More likely a chronic condition with flare ups similar to asthma!

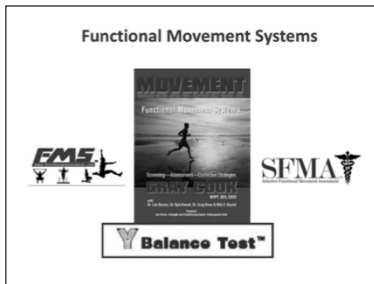
How Do We Identify Risk?

- Internal Factors
 - Regional Interdependence Assessment
 - Movement
 - Load: endurance, strength, etc
 - Respiratory Integrity

Regional Interdependence Assessment

- Cervical: Stability
- Glenohumeral: Mobility
- Scapulothoracic: Stability
- **Thoracic: Mobility**
- Lumbar / Core: Stability
- **Hip: Mobility****

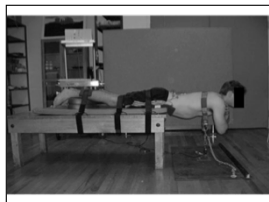




Movement



"Durability is More Important than Ability"



Load: Endurance



Respiratory Integrity



Lacking Integrity

How Do We Identify Risk?

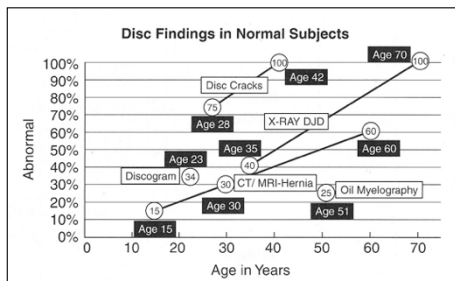
- External Factors
 - Type of Employment
 - Type of Sport
- Other Factors
 - Stress Monitoring
 - Level of Physical Activity

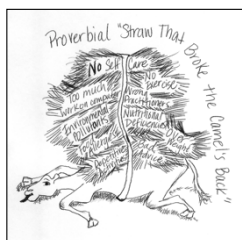
“Prediction is very difficult,
especially about the future”

Niels Bohr (Danish physicist: 1885-1962)



“Mechanism of Injury”





Microtrauma: Repeated or prolonged...sitting, bending, lifting

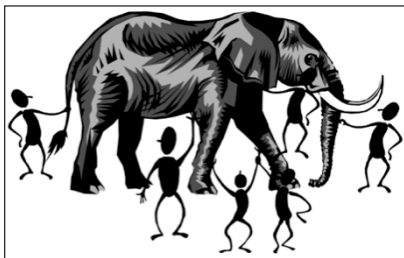


First things first!

[illegible]

IT DEPENDS

- Definition of "Stability"
- Stability Around the World
- Motor Control
- Static Stability
- Dynamic Stability
- Achieving Variability



Six Blind Men & The Elephant
John Godfrey Saxe

- *It was six men of Indostan*
- *To learning much inclined,*
- *Who went to see the Elephant*
- *(Though all of them were blind)*
- *That each by observation*
- *Might satisfy his mind*

**The First approach'd the
Elephant,
And happening to fall
Against his broad and sturdy
side
At once began to bawl:
"God bless me! But the Elephant
Is very like a wall**

**The Second, feeling of the tusk,
Cried, - "ho! What have we here
So very round and smooth and
sharp
To me 'tis mighty clear
This wonder of an Elephat
Is very like a spear!"**

The Third approached the
 animal,
 And happening to take
 The squirming trunk within his
 hands,
 Thus boldly up an dsnake:
 "I see" quoth he, "the Elephant
 Is very like a snake!"

The Fourth reached out his
 eager hand,
 And felt about the knee.
 "What most this wondrous
 beast is like
 Is mighty plain," quoth he,
 "This clear enough the Elephant
 Is very like a tree!"

The Fifth, who chanced to
 touch the ear,
 Said: "E'en the blindest man
 Can tell what this resembles
 most;
 Deny the fact who can
 This marvel of an Elephant
 Is very like a fan!"

**The Sixth no sooner had begun
About the beast to grope,
Then, seizing on the swinging
tail
That felt within his scope,
“I see,” quoth he, “the Elephant
Is very like a rope!”**

- *And so these men o f Indostan*
- *Disputed loud and long,*
- *Each in his own opinion*
- *Exceeding stiff and strong*
- *Though each was partly in the right*
- *And all were in the wrong!*

**So oft in theologic wars,
The disputants, I ween,
Rail on in utter ignorance
Of what each other mean,
And prate about an Elephant
Not one of them has seen!**

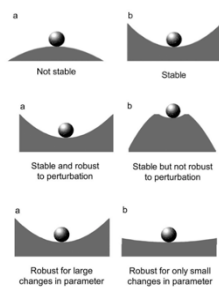
(moral)

Spinal Stability: a history lesson

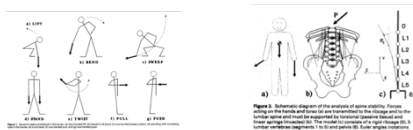
- A Bergmark
- J. Cholewicki
- P. Hodges
- S. McGill
- P. Kolar
- P. Reeves

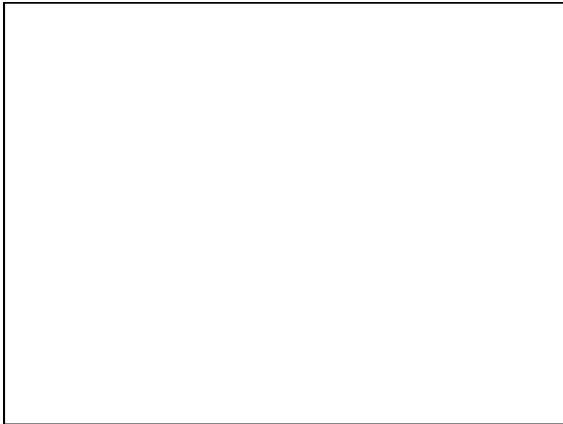


Bergmark, 1980s



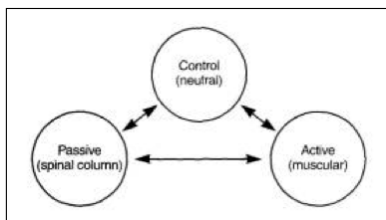
Cholewicki, 1990s





Hodges - Queensland, AUS



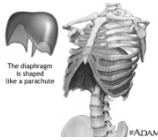


Motor Control

McGill - Waterloo, CAN

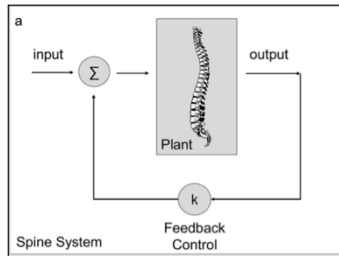


Kolar - Prague



Reeves - Michigan State, USA

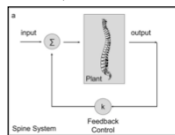




The Plant & The Controller

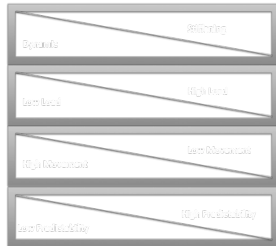
Applied Plant & Controller

- Two-way interaction (Context Dependent)
- Top-down & Bottom-up
- Controller (volitional)
 - "Braking subway"
 - Tune stiffness up/down (Dimmer Switch)
- Plant (reflexive)
 - "Riding a roller coaster"
 - Engage when necessary



Feedback/Reflexive Control <===== Volitional Stability

The Stability-Motor Control Continuum



Stability - Motor Control Continuum

"Variability"

- Merriam - Webster.com (noun)
 - "Able or apt to vary"
- Thefreedictionary.com
 - "The quality, state, or degree of being variable or changeable"

Components for Variability

- Optimal Mobility
- Core Integrity
- Stiffness
- Core Endurance
- Respiratory Control
- Instantaneous Power
- Athleticism

Components for Variability

- **OPTIMAL MOBILITY**
- Core Integrity
- Stiffness
- Core Endurance
- Respiratory Control
- Instantaneous Power
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Regional Interdependence Assessment

- Cervical: Stability
- Glenohumeral: Mobility
- Scapulothoracic: Stability
- **Thoracic: Mobility**
- Lumbar / Core: Stability
- **Hip: Mobility****



Dynamic Regional Interdependence (Joint by Joint Reloaded)

- Plane Dominance
 - Sagittal, Frontal, Transverse
- Punctum Fixum / Punctum Mobilum
- "Tightness" due to instability

IT DEPENDS

Components for Variability

- Optimal Mobility
- **CORE INTEGRITY**
- Stiffness
- Core Endurance
- Respiratory Control
- Instantaneous Power
- Athleticism

**Sweat the small
stuff!!**

Core Integrity

- Hip Mobility
- Thoracic Mobility
- Rib Cage Mobility
- Diaphragmatic Breathing
- Cylindrical Muscle Activation

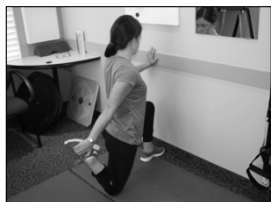
Hip Mobility

- Rolling (Reset)
- Stretch
- Mobilize
- Load

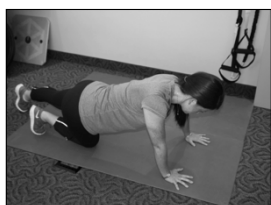




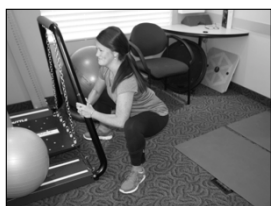
Rolling (Reset)



Stretch



Mobilize



Load

Thoracic Mobility

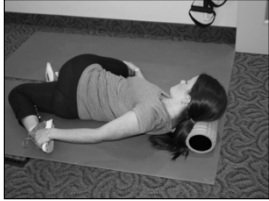
- Rolling (Reset)
- Stretch
- Mobilize
- Load



Rolling (Reset)



Stretch



Mobilize



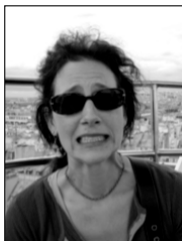
Load

Rib Cage Mobility

- Mobilize
- Load (Integrate with breathing and bracing)

Know what you are working with!

- Faulty Patterns
 - Inspiratory Position
 - Neck muscle hypertonicity
 - Shoulder protraction
 - T-L Junction hyperextension
 - Rib flare - bilateral, unilateral
- Seated, Supine, Prone



Expiratory Position Test (Seated)

Isolated Respiratory Training

- Seated
- Supine
- Prone
- Balloon Breathing

Seated

Supine

Prone

Balloon Breathing

Breathing Drills

- Anterior
- Lateral
- Posterior

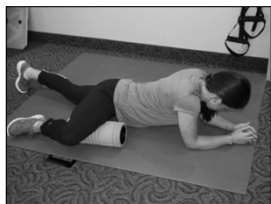
Hip Mobility (Rolling)

- Quadriceps
- Adductors
- Lateral Quadriceps / Gluteus Medius
- Deep Posterior Muscles





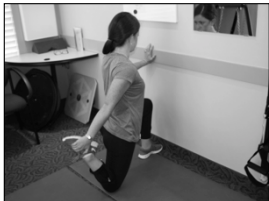


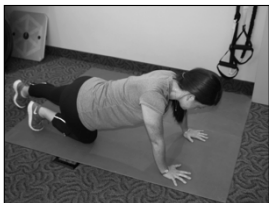




Hip Mobility (Stretch)

- Hip Flexors
- Deep Posterior Hip







Hip Mobility (Mobilize)

- Deep Posterior Muscles/Capsule
- Frogs

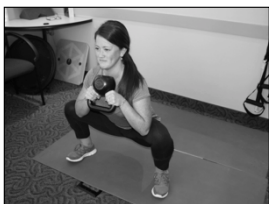






Hip Mobility (Load)

- Goblet

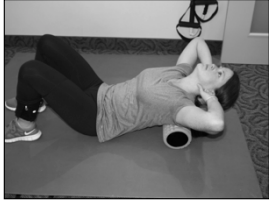




Thoracic Mobility (Rolling)

- Erectors
- Intersegmental

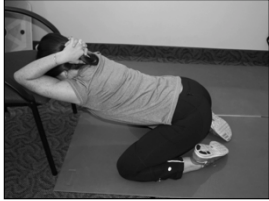




Thoracic Mobility (Stretch)

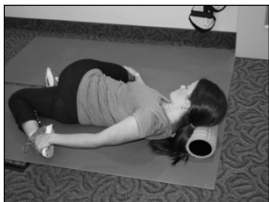
- Quadruped
- Quadruped supported





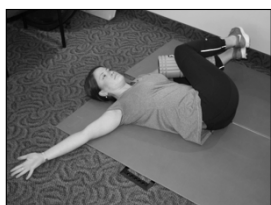
Thoracic Mobility (Mobilize)

- Brettzels



Thoracic Mobility (Load)

- Supine Trunk Rotation
- Kettlebell Armbars

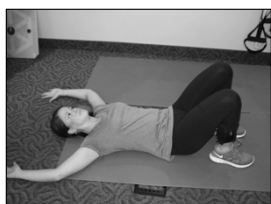






Rib Cage Mobility

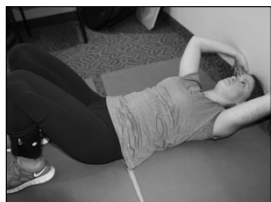
- Supine Angels
- Seated Wall Angels



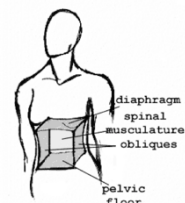
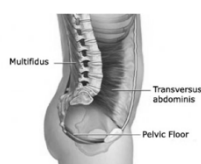


Integrated Respiration

- Balloon Breathing
- Wall Push + _____

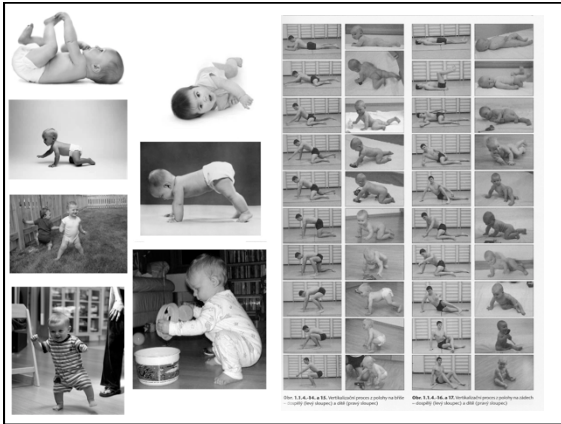


Cylindrical Muscle Activity (Integrated Spinal Stabilization System)



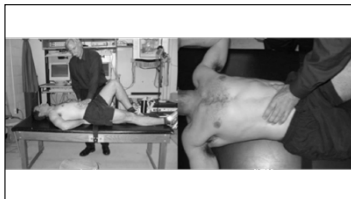
Prague Influence

- Every exercise is a test
- Diaphragm
 - Respiratory & Postural Function
- Centration
 - Path of Instantaneous Center of Rotation
- Neurodevelopmental Positions
 - Supine to Prone to Kneeling to Half Kneeling to Standing
- Punctum Fixum / Punctum Mobilum
 - Supporting Limb vs Stepping Limb



Components for Variability

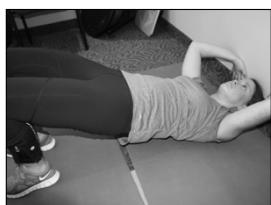
- Optimal Mobility
- Core Integrity
- **STIFFNESS**
- Core Endurance
- Respiratory Control
- Instantaneous Power
- Athleticism



Stiffness

Integrated Cylindrical Muscle Activity & Stiffness

- Wall Push +
- Glute Bridge
- Deadbug Hip Isolation



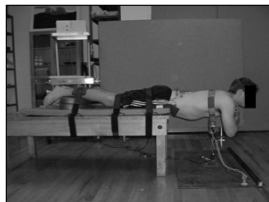


Components for Variability

- Optimal Mobility
- Core Integrity
- Stiffness
- **CORE ENDURANCE**
- Respiratory Control
- Instantaneous Power
- Athleticism

Core Endurance

- Extension Endurance
- Lateral Endurance
- Flexion Endurance









Training for Endurance

Components for Variability

- Optimal Mobility
- Core Integrity
- Stiffness
- Core Endurance
- **RESPIRATORY CONTROL**
- Instantaneous Power
- Athleticism



Key Factors to Respiratory Control

- Core Centration
- Intra-abdominal Pressure

Centration Examples

1. Dying Bug + Wall Push
2. Quadruped Rockback RNT
3. Kneeling Plank Walkout
4. Stability Ball Rollout
5. Ab Wheel Rollout
6. Plank Walkout
7. Quadruped Valslide Circuit

Components for Variability

- Optimal Mobility
- Core Integrity
- Stiffness
- Core Endurance
- Respiratory Control
- **INSTANTANEOUS POWER**
- Athleticism

Don't forget to lift!



Bells / Balls / Bars

Motor Control Reflexive Activity & Relaxation

ScienceDirect
The intrinsic reflexes of the in vivo lumbar spine in response to
quick releases: Implications for reflexive requirements
Stephen D.M. Brown^a, Robert M. McGill^b
^aDepartment of Mechanical Engineering, University of Waterloo, 280 Main Street West, Waterloo, ON N2L 3G1, Canada
^bMcGill Graduate Program in Biomechanics, 360 University Avenue, Montreal, Quebec H3T 3J4, Canada

**BALLETIC ABDOMINAL EXERCISES:
MUSCLE ACTIVATION PATTERNS DURING THREE
ACTIVITIES ALONG THE STABILITY/MOBILITY
CONTINUUM**
Robert M. McGill, Ben Knapik, and Peter M.J. Fong
McGill Graduate Program in Biomechanics, Department of Mechanical Engineering, University of Waterloo, Waterloo, Ontario, Canada

Components for Variability

- Optimal Mobility
- Core Integrity
- Stiffness
- Core Endurance
- Respiratory Control
- Instantaneous Power
- **BUILDING ATHLETICISM**

Building Athleticsm

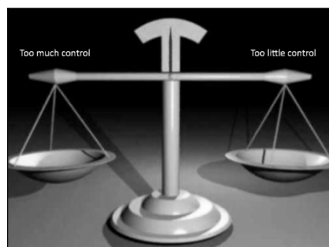
- Push, Pull, Lift, Carry, Torsional Buttrass
- Static to Dynamic Control
 - Stiffening, High Load, Low Movement, High Predictability
 - Dynamic, Low Load, High Movement, Low Predictability



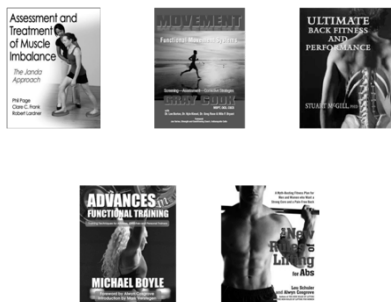
Static



Dynamic

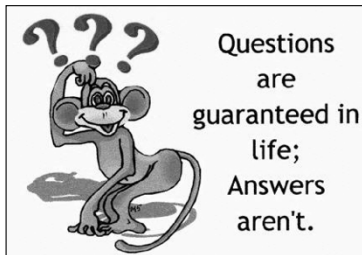


Stability & Control





***“Durability is More Important than
Ability”***



Thank you!
