

& Core Training

An Interdisciplinary Approach for Health,
Fitness, Rehabilitation and Performance



“Assessment & Injury Prevention”

Jeff Cubos

& Core Training

An Interdisciplinary Approach for Health,
Fitness, Rehabilitation and Performance



“Comprehensive* Stability”

Jeff Cubos

& Core Training

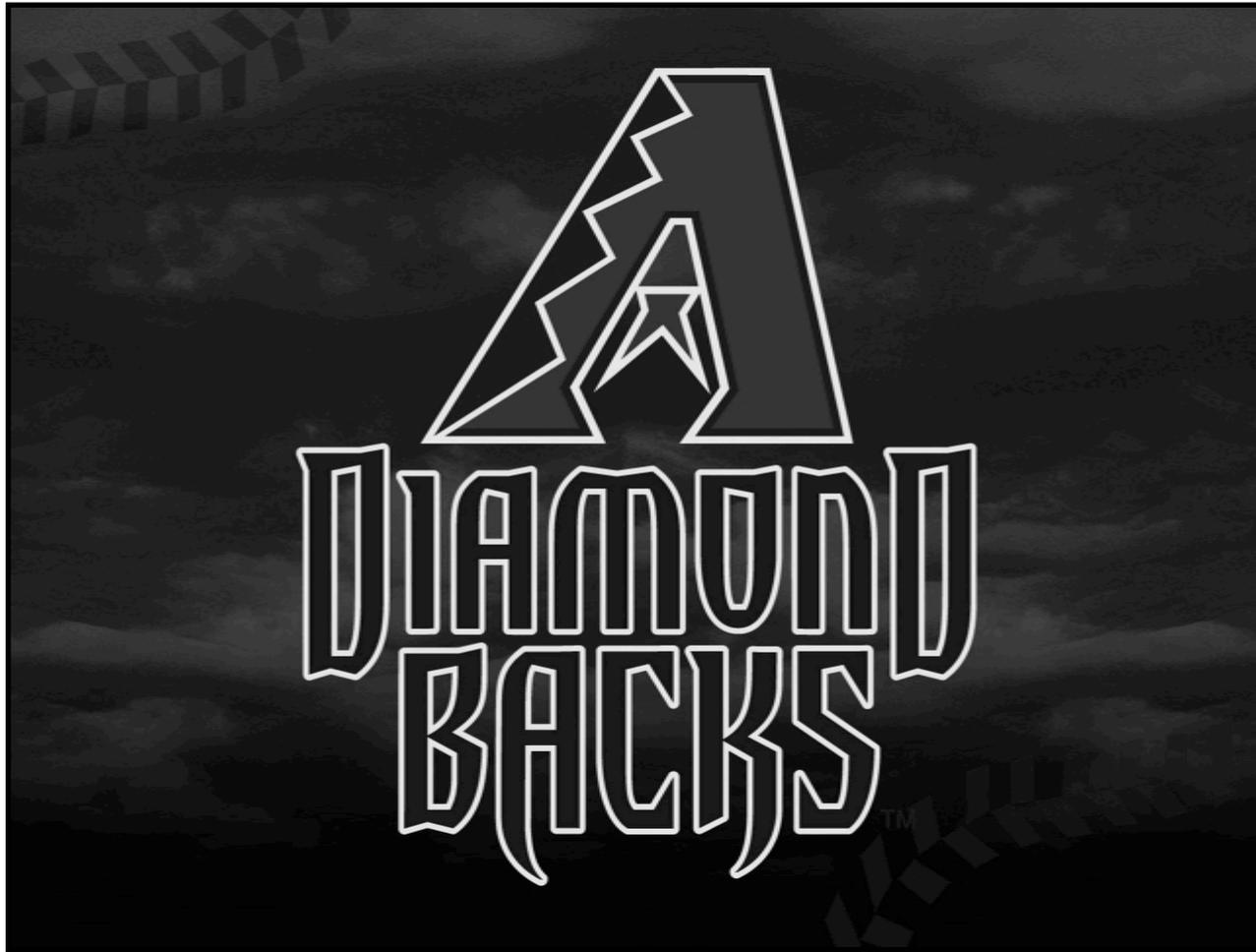
An Interdisciplinary Approach for Health,
Fitness, Rehabilitation and Performance



“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

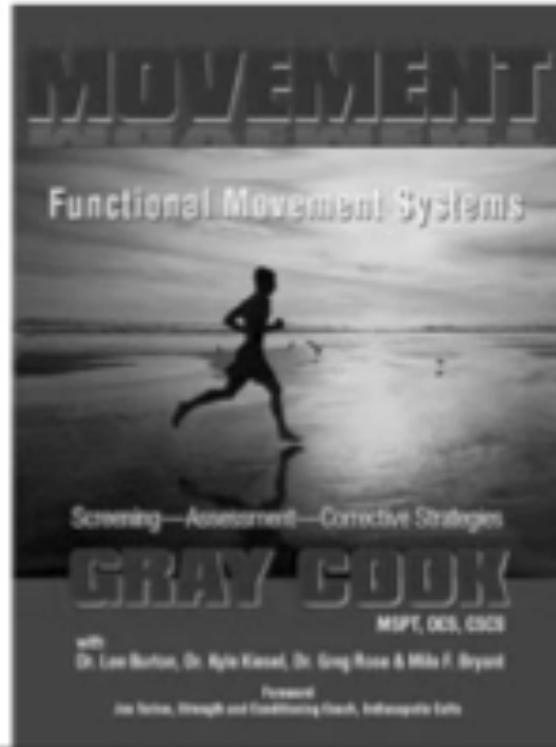
Regional Interdependence

Assessment

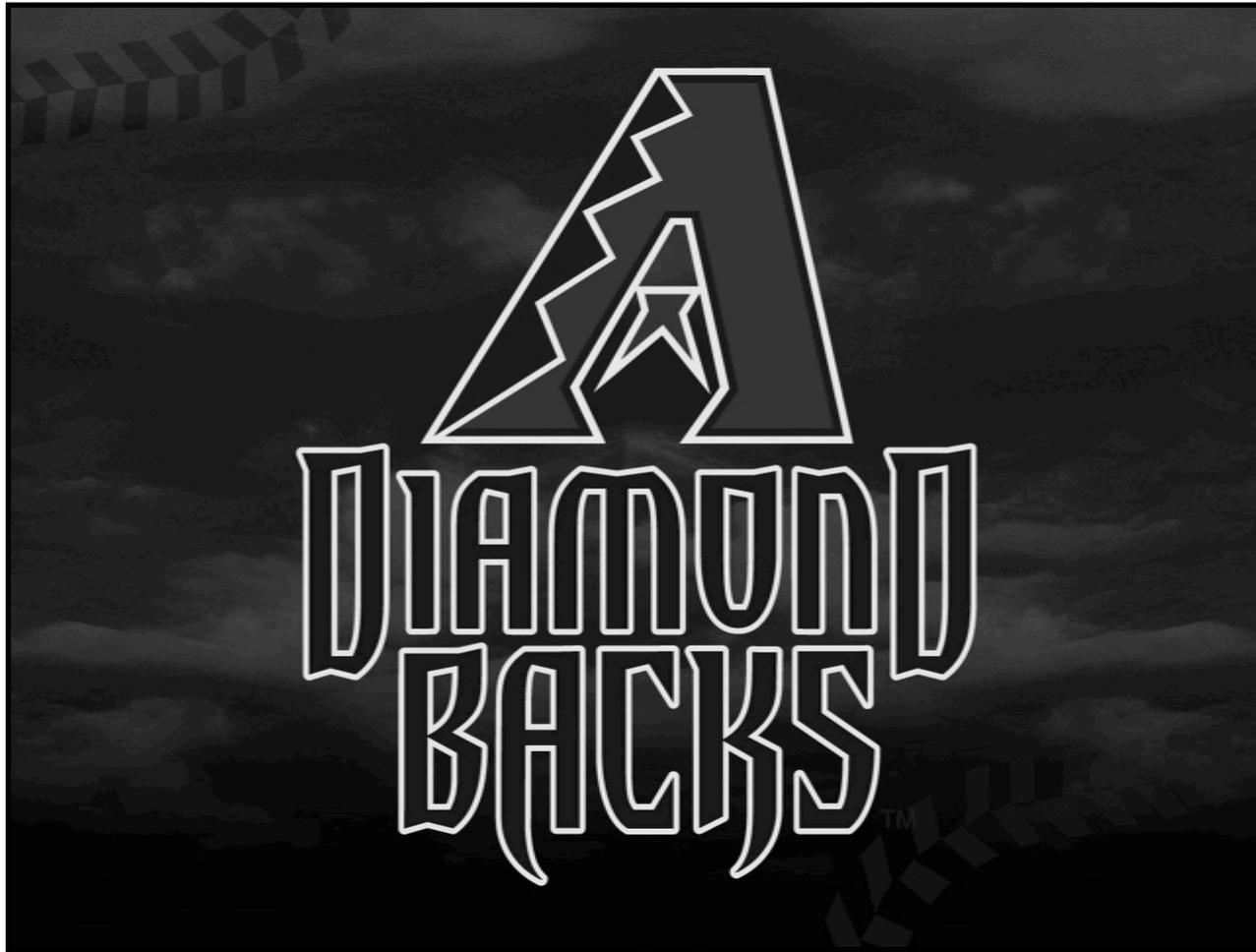
- Cervical: Stability
- Glenohumeral: Mobility
- Scapulothoracic: Stability
- **Thoracic: Mobility**
- Lumbar / Core: Stability
- **Hip: Mobility****



Functional Movement Systems



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

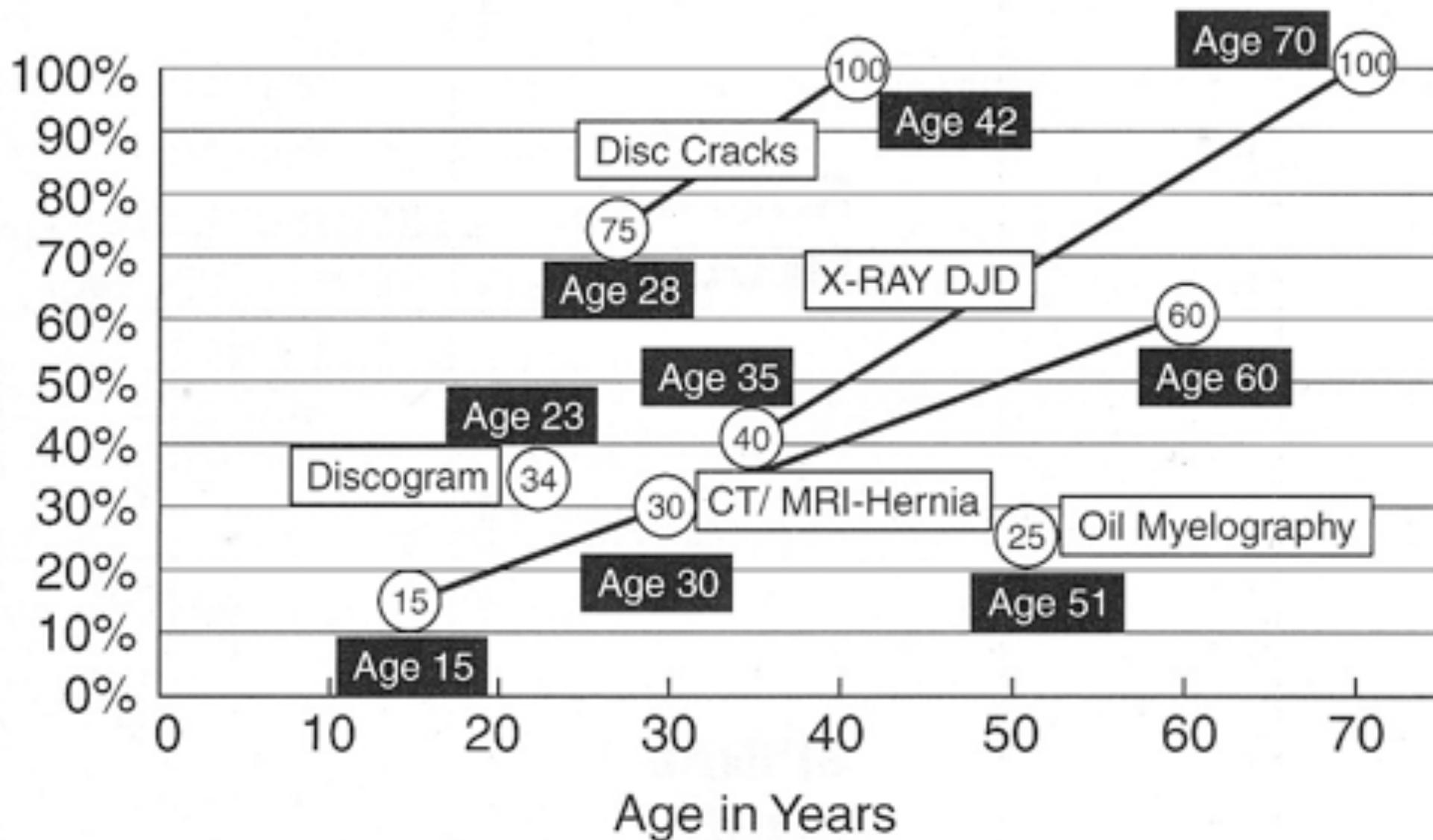
“Prediction is very difficult,
especially about the future’

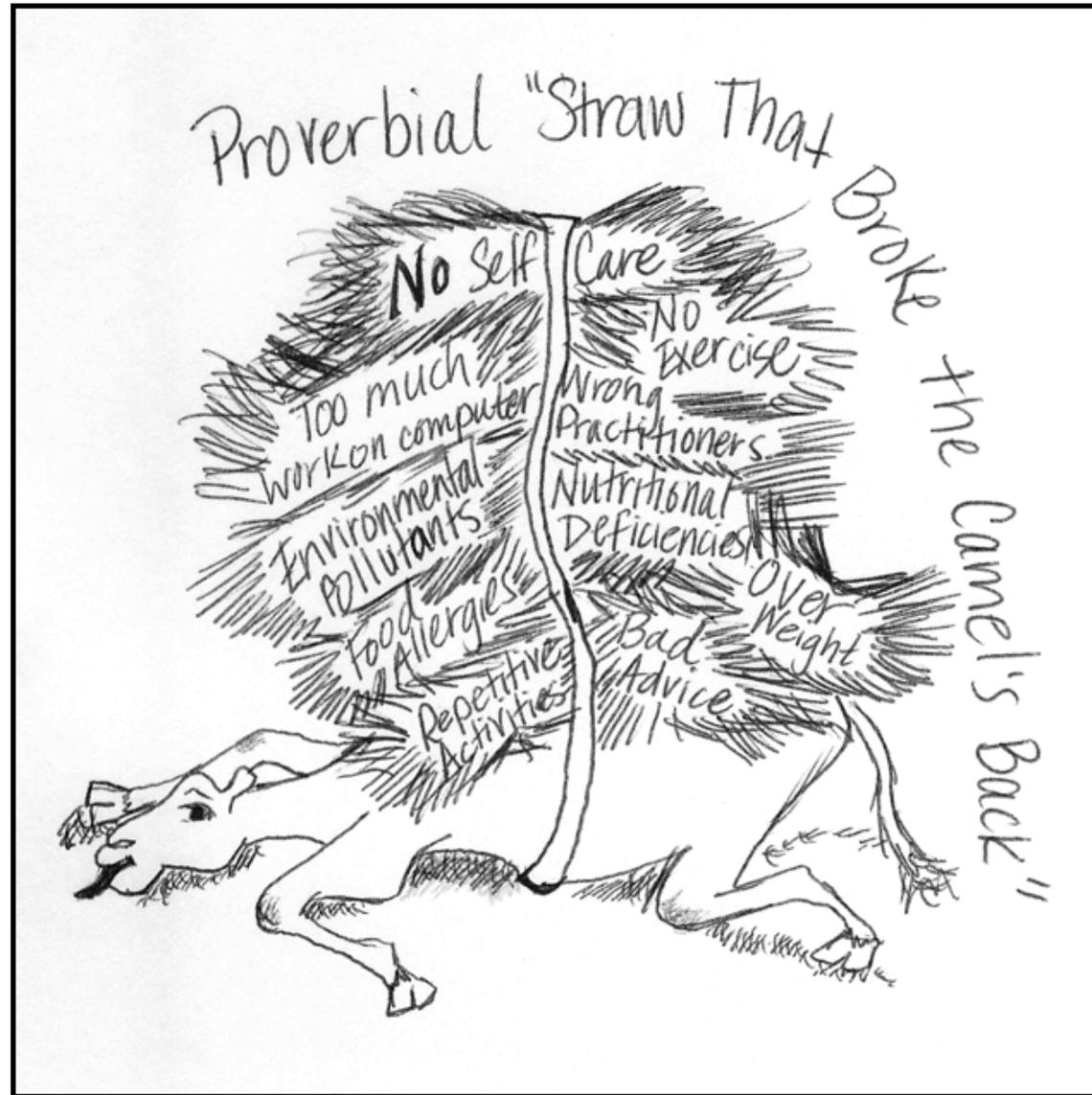
Niels Bohr (Danish physicist: 1885-1962)



“Mechanism of Injury”

Disc Findings in Normal Subjects





Microtrauma: Repeated or prolonged sitting bending lifting

DON'T CROSS THE LINE



First things first!

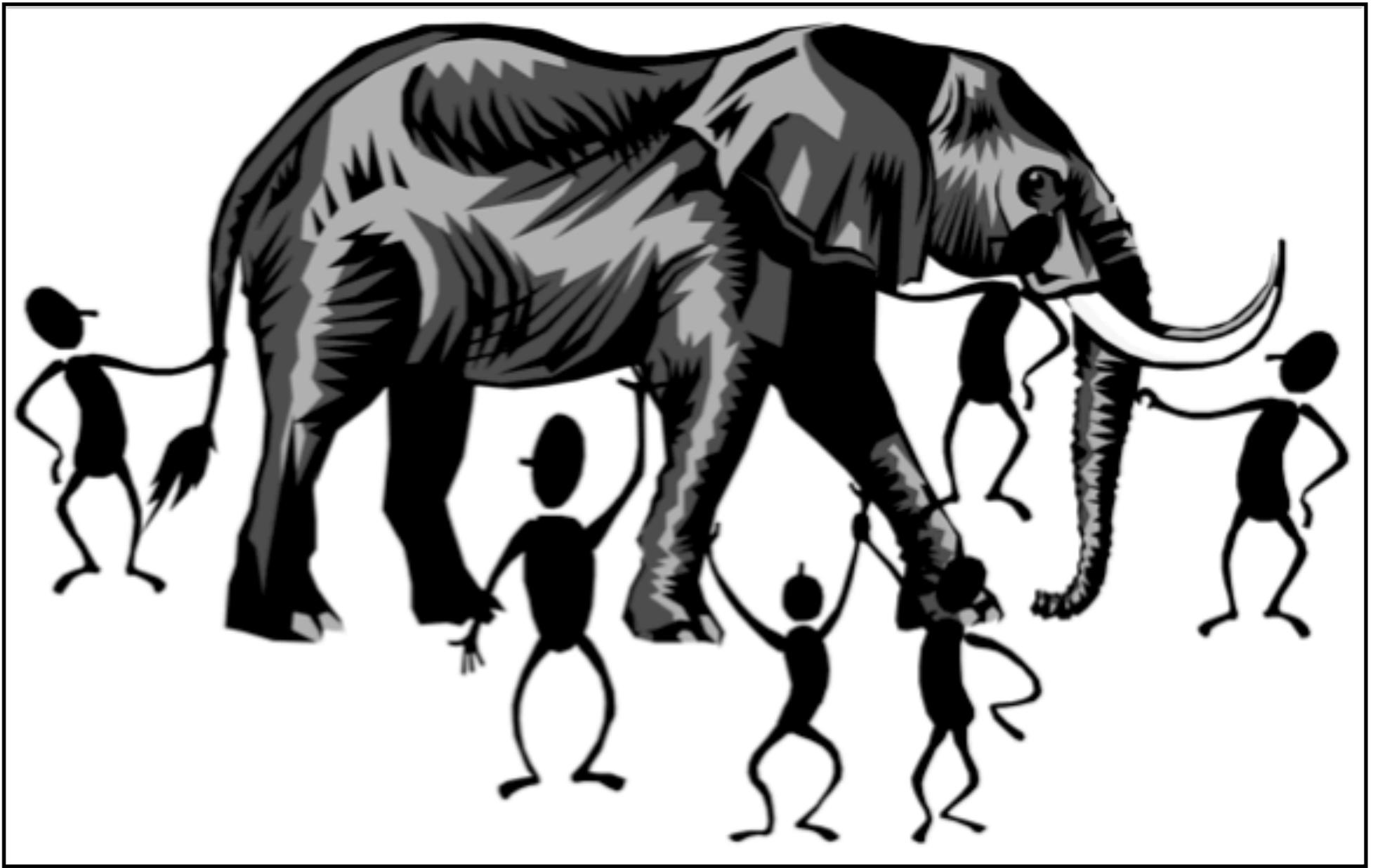


Table 3. How The Emergency Physician Considers The Differential Diagnosis Of Back Pain.

Immediate Threats To Life	Gynecologic
AAA	• Abruptio placenta
Pulmonary embolism (upper and mid-back— generally not lower back)	Serious But Not Acutely Dangerous
Thoracic aortic dissection (upper and mid-back— generally not lower back)	Vertebral
Myocardial infarction (upper and mid-back— generally not lower back)	• Osteomyelitis
	• Pott's Disease (tubercu- losis of spine)
	• Tumor
	• Stable fracture
	• Spondylolisthesis
	Disc
	• Herniated Disc
	• Discitis
Immediate Threats To Spinal Cord	Rheumatologic
Epidural mass effect	• Ankylosing spondylitis
• Tumor	Abdominal
• Hematoma	• Pancreatitis
• Abscess	Gynecologic
• Disc herniation (rarely causes acute threat in lumbar area)	• PID
	Less Serious (But May Represent A Pain Emergency)
Urgent Threats	Renal
Cardiac	• Ureteral Colic
• Endocarditis	Gynecologic conditions
Renal	• Pregnancy
• Pyelonephritis	• Endometriosis
• Infected stone	• Ovarian conditions
• Renal artery dissection	• Dysmenorrhea
Abdominal	Musculoskeletal
• Perforated ulcer	• Lumbosacral strain
Vertebral	Varicella Zoster
• Unstable fracture	

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**

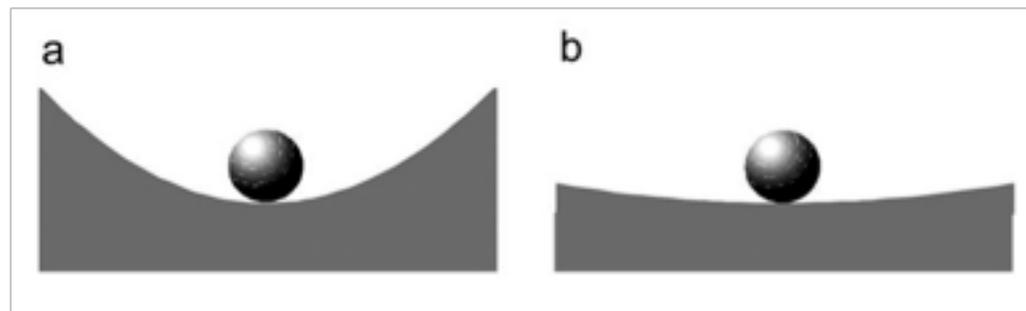
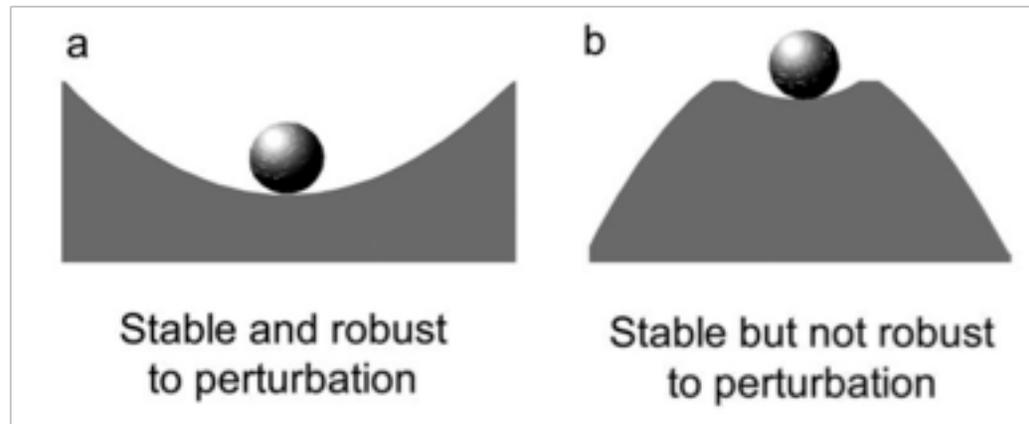
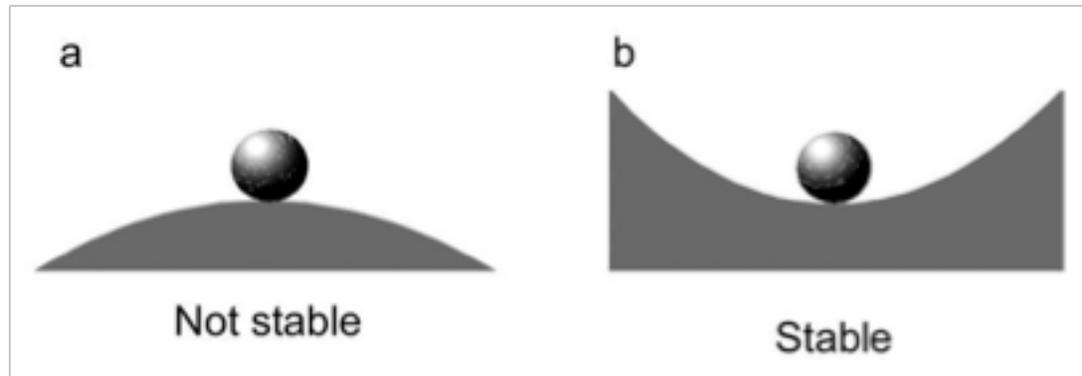
**That felt within his scope,
‘I see,’ quoth he, “the Elephant
Is very like a rope!”**

- *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!*

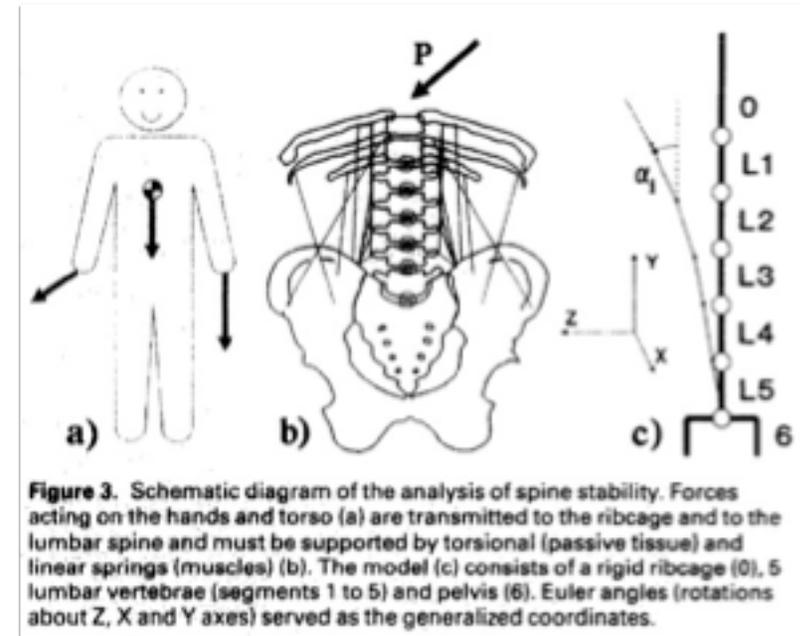
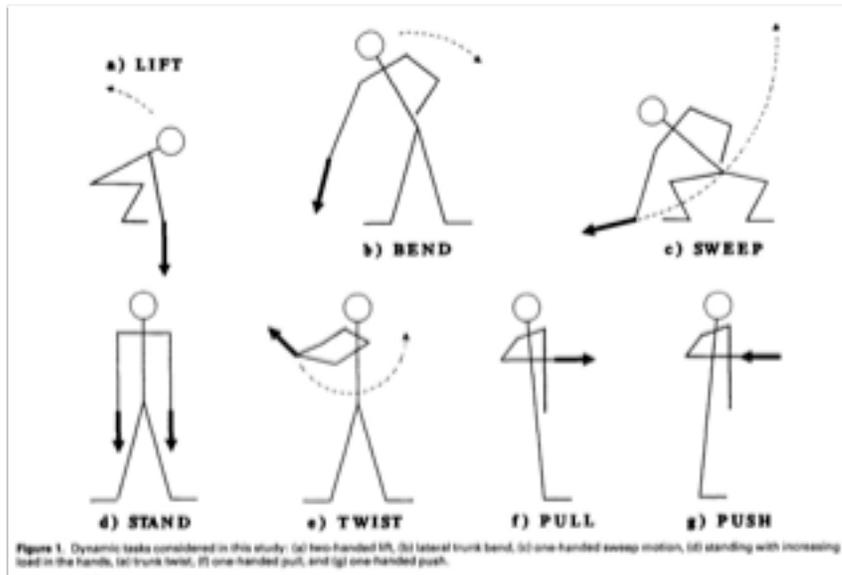
**So oft in theologic wars,
The disputants, I ween,
Rail on in utter ignorance
Of what each other mean,
And prate about an Elephant
Not one of them has seen!**

(moral)

Bergmark, 1980s

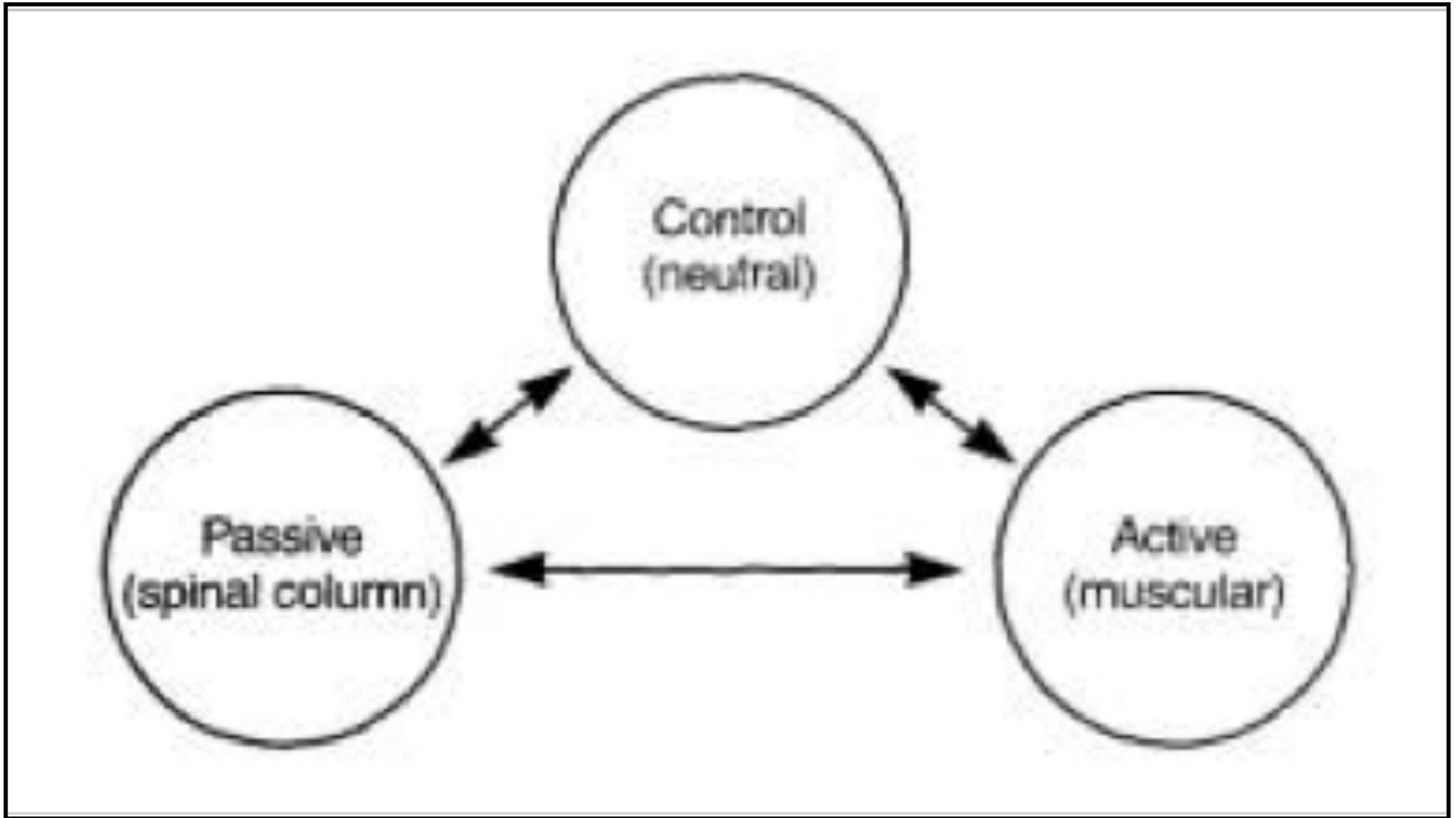


Cholewicki, 1990s



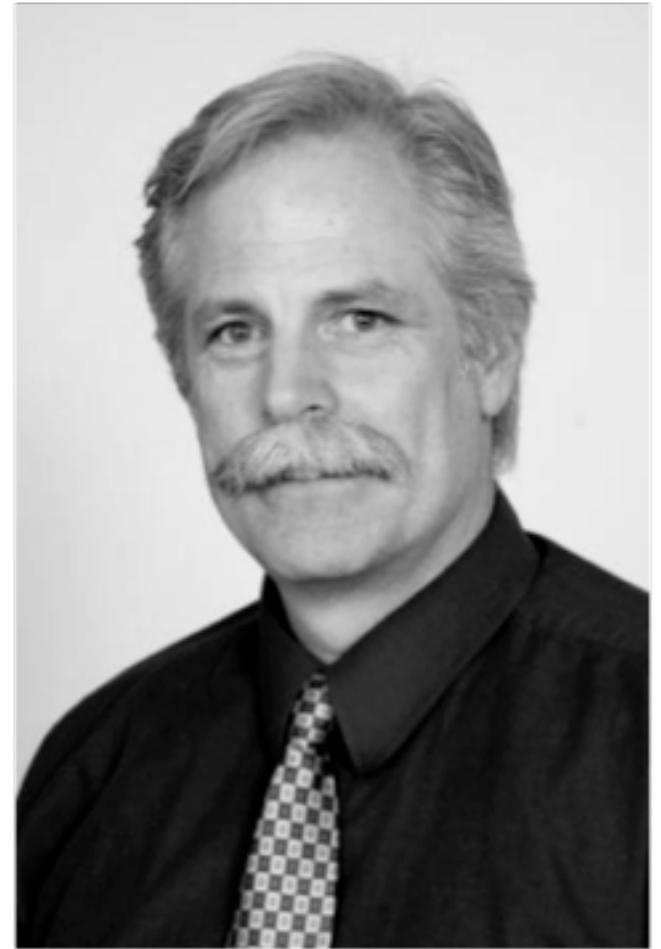
Mouges - Queensland, AUS





Motor Control

TRIGGERS - WATERHOOD, CAN



Kolar - Prague



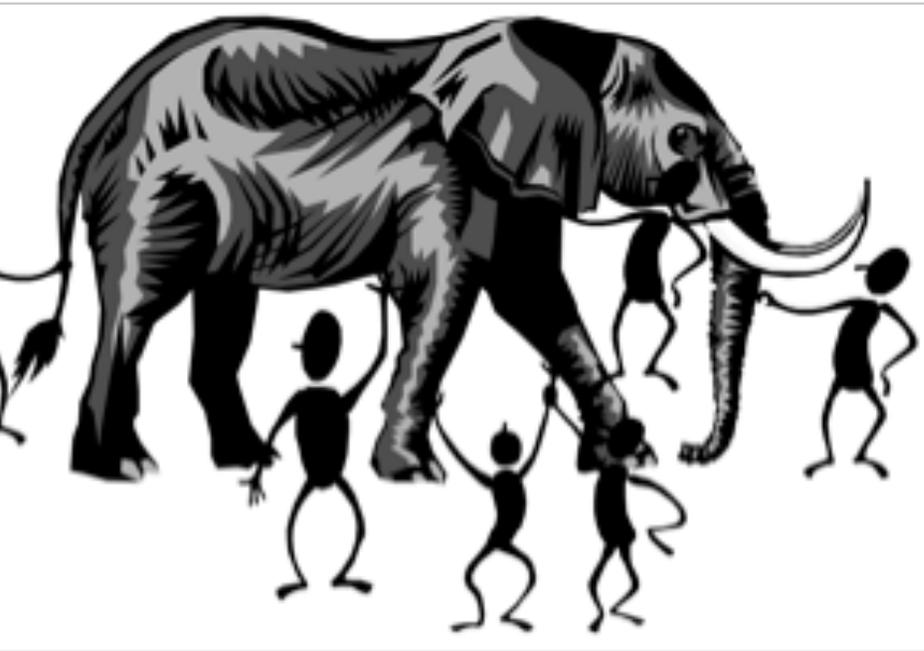
The diaphragm
is shaped
like a parachute

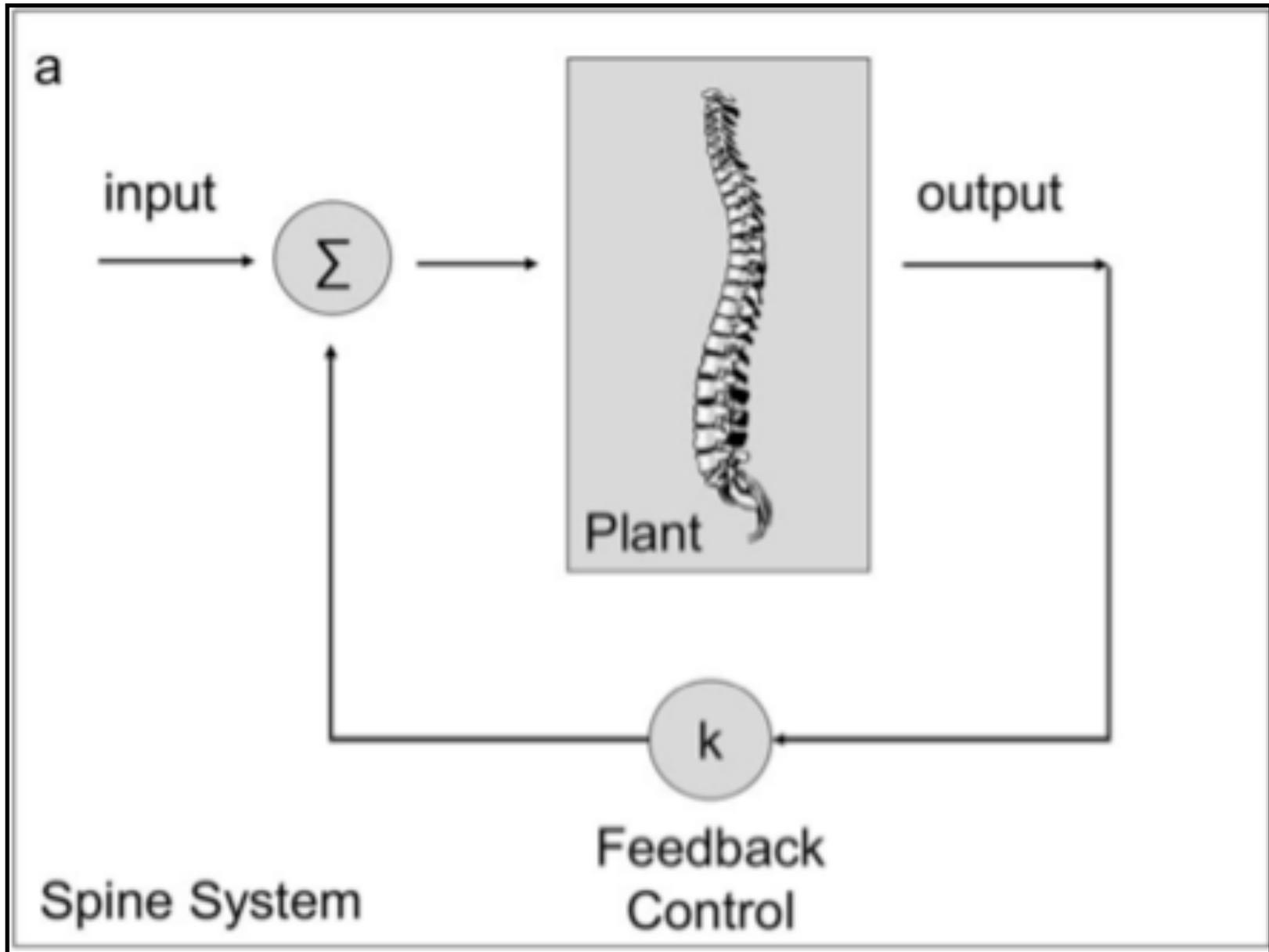


ADAM.



Reeves - Michigan State, USA

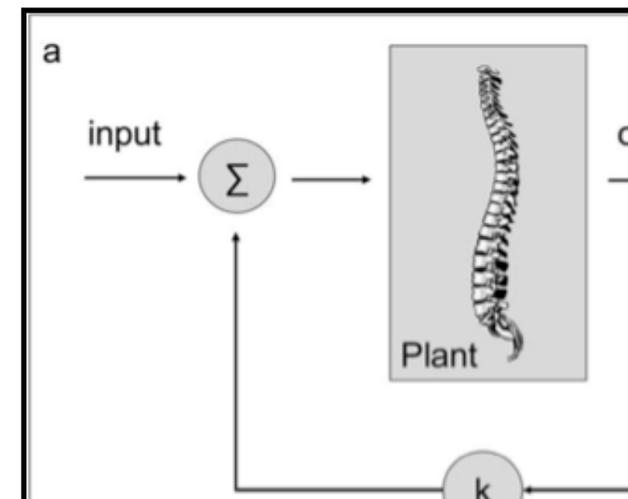




The Plant & The Controller

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



ack/Reflexive Control <=====> Volitional St

The 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
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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 DEPEND

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 Respiration 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





Motoric Mobility (Rolling)

- Erectors
- Intersegmental





Molecular Mobility (Stretch)

- Quadruped
- Quadruped supported





Proactive Mobility (Mobilize)

- Brettzels



Thoracic Mobility (Load)

- Supine Trunk Rotation
- Kettlebell Armbars







Rib Cage Mobility

- Supine Angels
- Seated Wall Angels



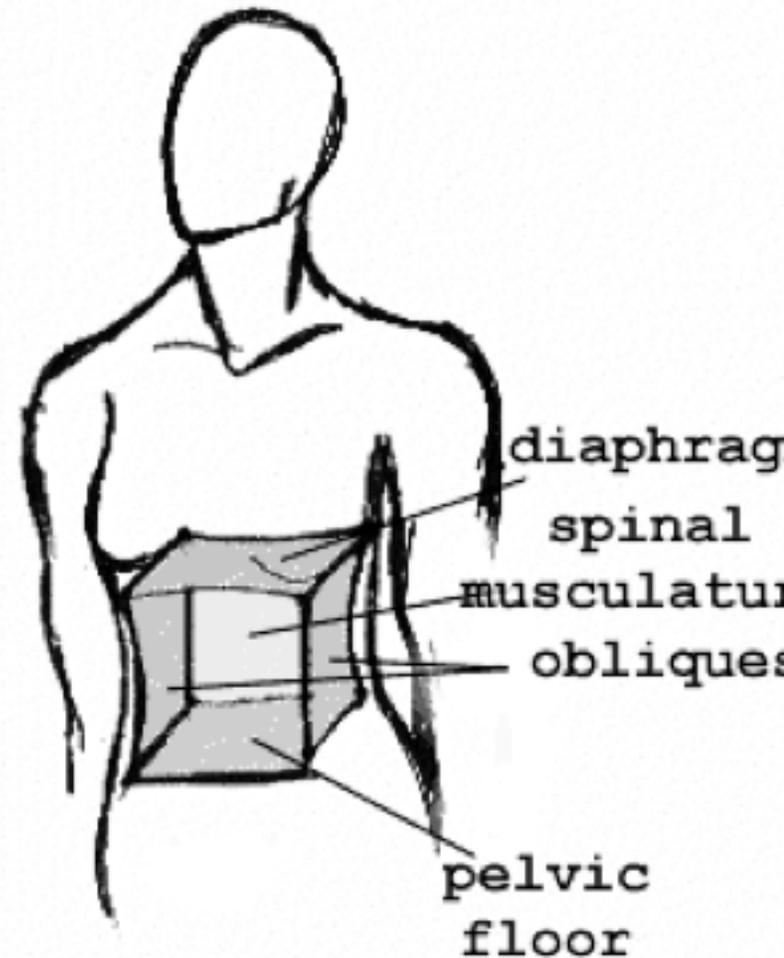
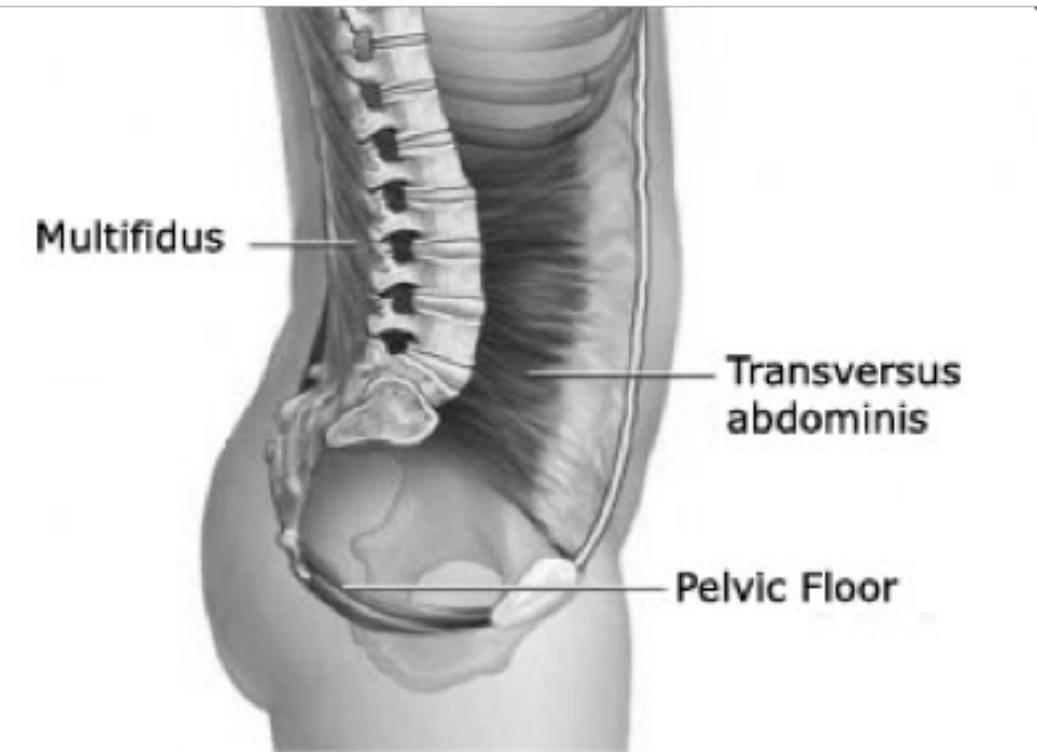


Integrated Respiration

- Balloon Breathing
- Wall Push + _____

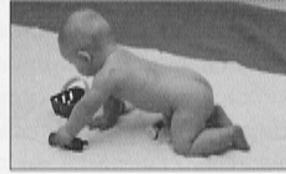
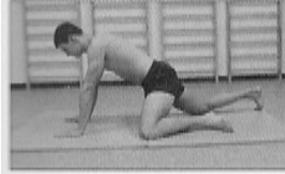
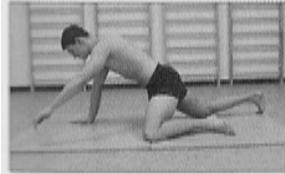
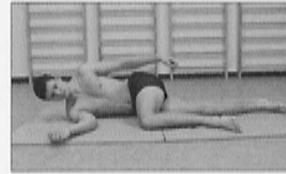
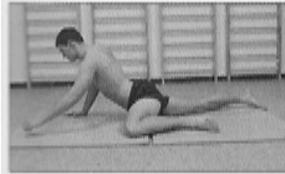
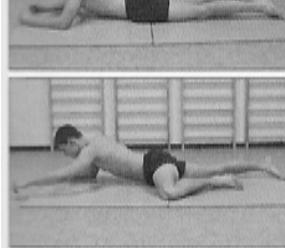


Cylindrical Muscle Activity (Integrated Spinal Stabilization System)



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

Muscle Activity & Stiffness

- Wall Push +
- Glute Bridge
- Deadbug Hip Isolation



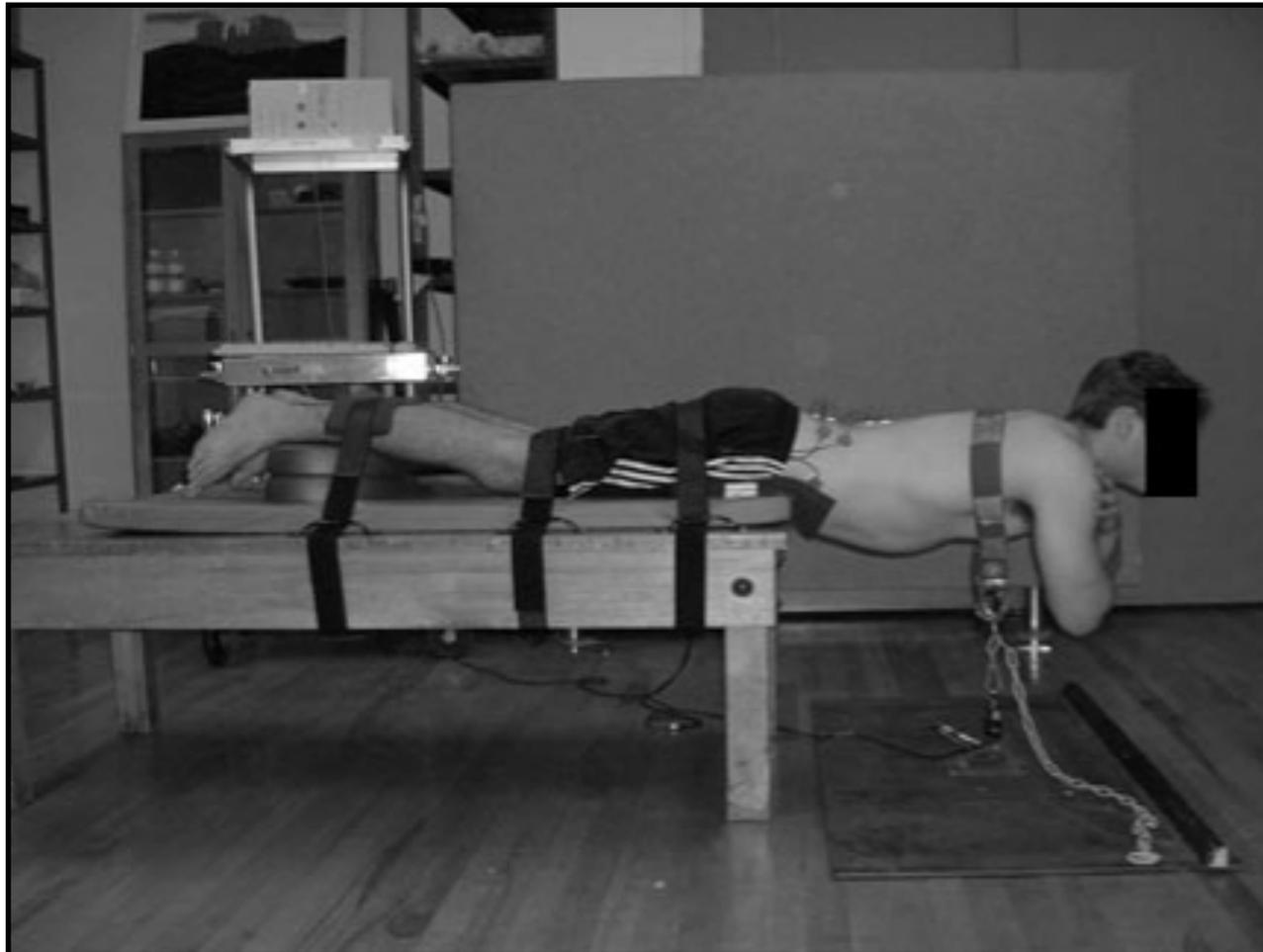


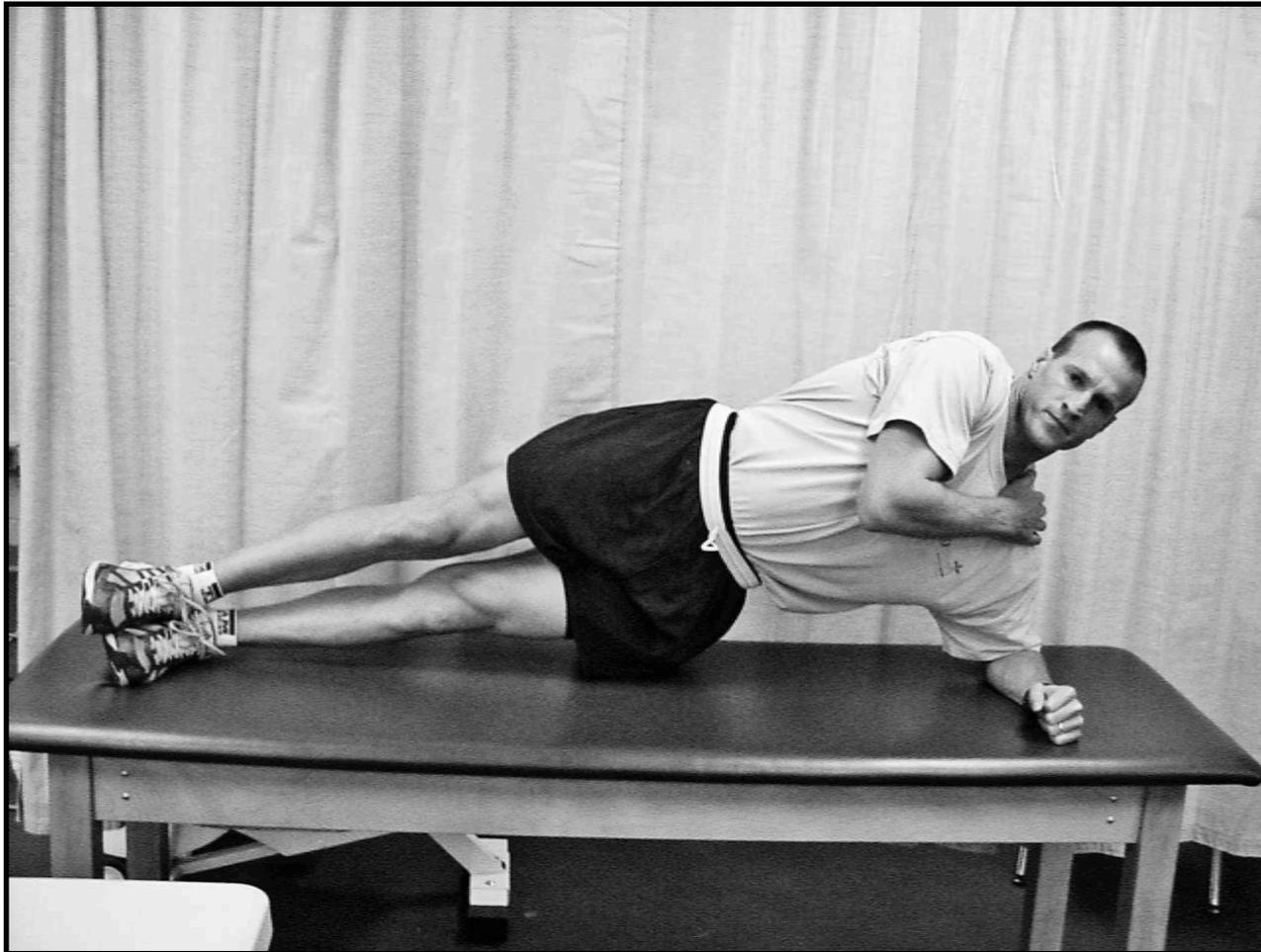
Components for Variability

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

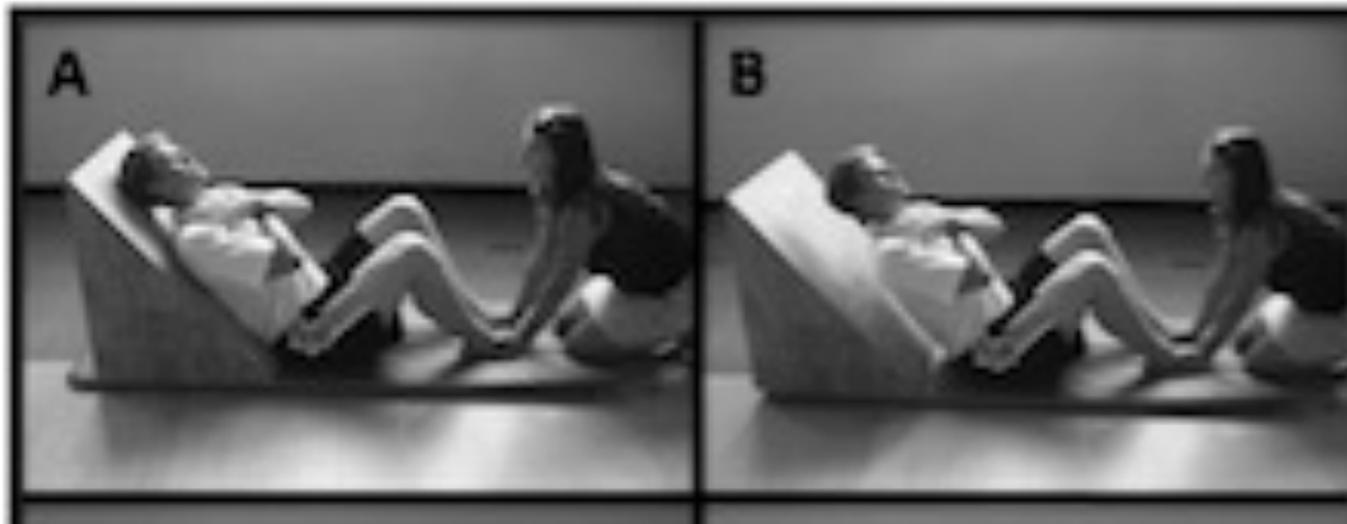
Core Endurance

- Extension Endurance
- Lateral Endurance
- Flexion Endurance





S. McGill et al. / Clinical tools to quantify torso flexion endurance





Hundred bar & grill

Training for Endurance

Components for Variability

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

**I'LL HAVE THE "ALL
OF THE ABOVE."**



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

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Intrinsic stiffness of the in vivo lumbar spine in response to quick releases: Implications for reflexive requirements

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BALLISTIC ABDOMINAL EXERCISES: MUSCLE ACTIVATION PATTERNS DURING THREE ACTIVITIES ALONG THE STABILITY/MOBILITY CONTINUUM

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Spine Biomechanics Laboratories, Department of Kinesiology, University of Waterloo, Waterloo, Ontario, Canada

Components for Variability

- Optimal Mobility

- Core Integrity

- Stiffness

- Core Endurance

- Respiratory Control

- Instantaneous Power

- **BUILDING ATHLETICISM**

Building Athleticsm

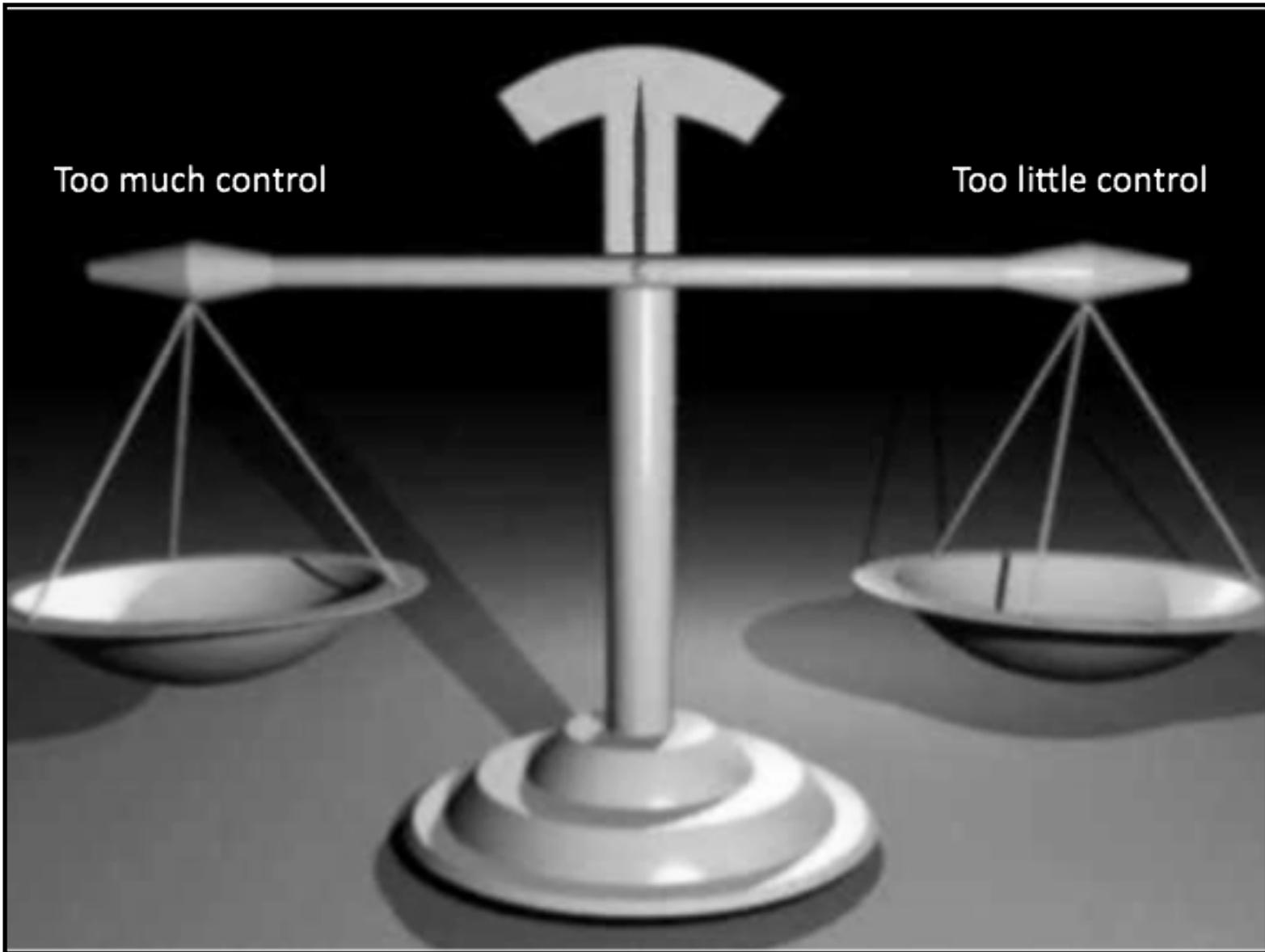
- Push, Pull, Lift, Carry, Torsional Buttress
- Static to Dynamic Control
 - Stiffening, High Load, Low Movement, High Predictability
 - Dynamic, Low Load, High Movement, Low Predictability



Static



Dynamic



Stability & Control

Assessment and Treatment of Muscle Imbalance

The Janda Approach

Phil Page
Clare C. Frank
Robert Lardner



MOVEMENT

Functional Movement Systems

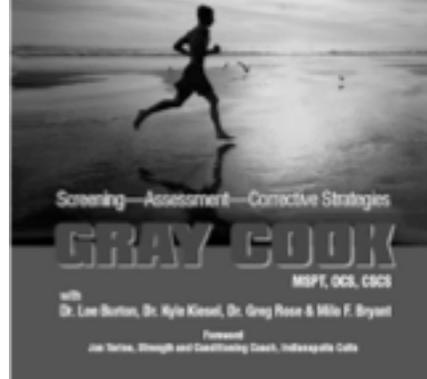
Screening—Assessment—Corrective Strategies

GRAY COOK

MSPT, CCS, CSCS

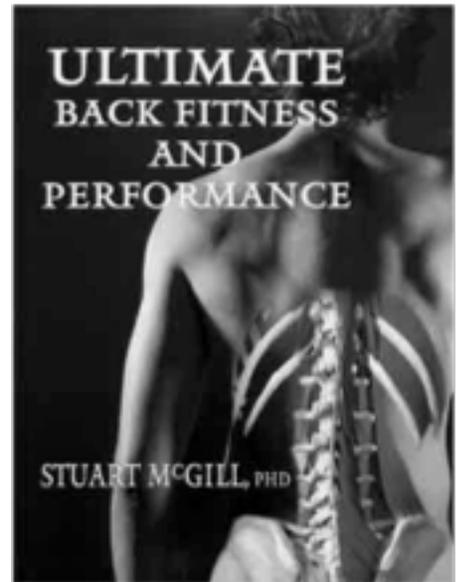
with Dr. Lee Burton, Dr. Kyle Kiesel, Dr. Greg Rose & Mike F. Bryant

Foreword
Jim Taylor, Strength and Conditioning Coach, Indianapolis Colts



ULTIMATE BACK FITNESS AND PERFORMANCE

STUART MCGILL, PHD

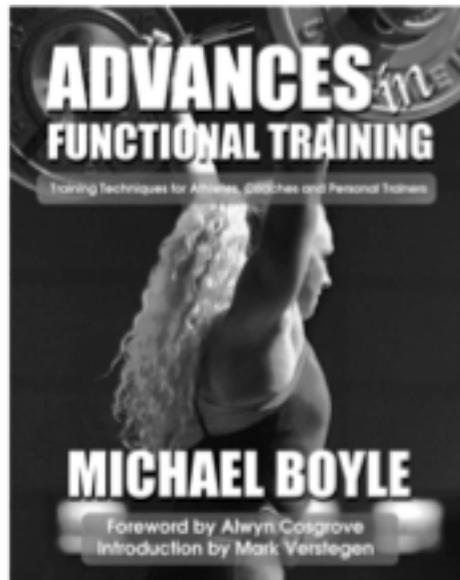


ADVANCES FUNCTIONAL TRAINING

Training Techniques for Athletes, Coaches and Personal Trainers

MICHAEL BOYLE

Foreword by Alwyn Cosgrove
Introduction by Mark Verstegen



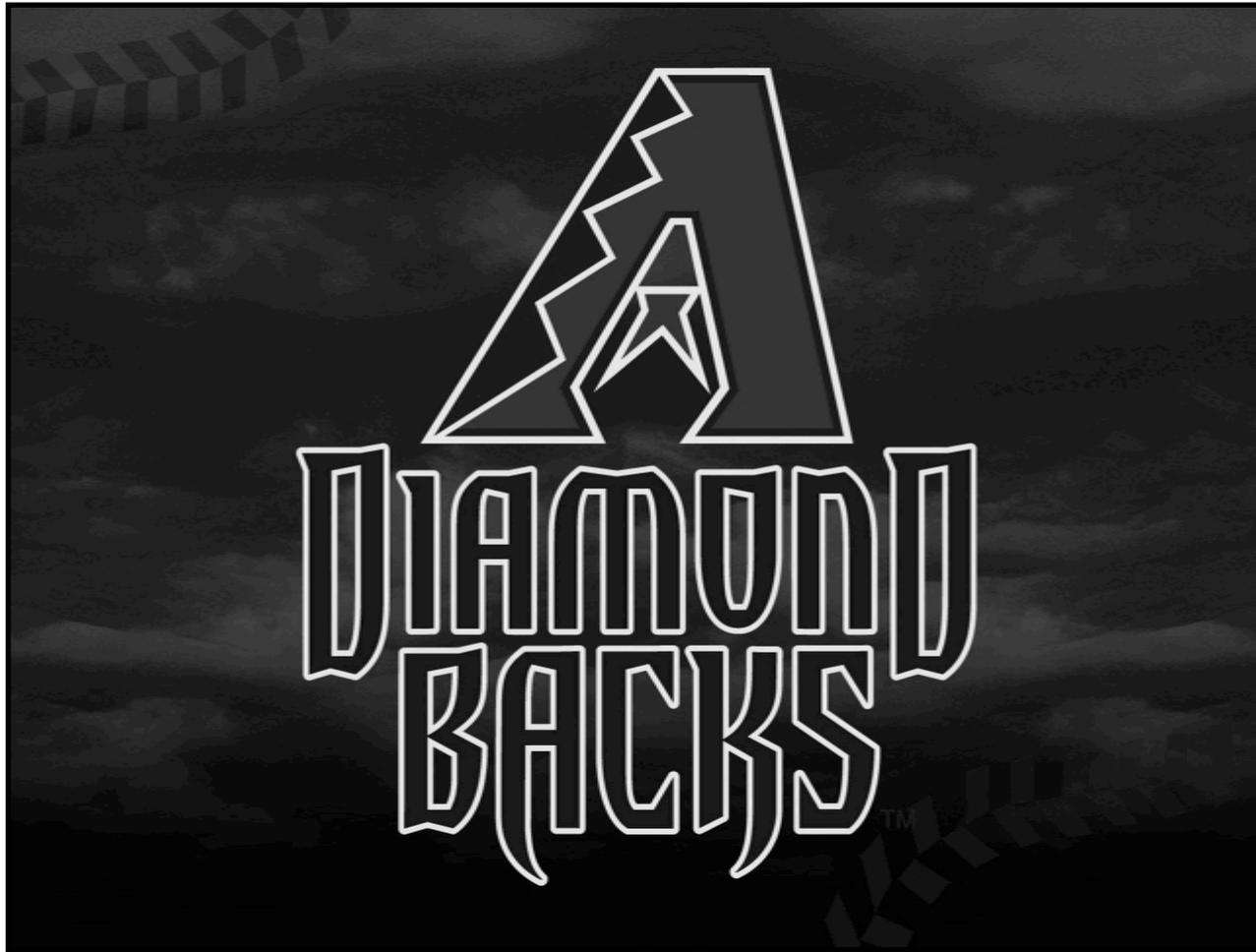
A Myth-Busting Fitness Plan for
Men and Women who Want a
Strong Core and a Pain-Free Back

The New Rules of Lifting for Abs

Lou Schuler
and Alwyn Cosgrove

Authors of THE NEW RULES OF LIFTING
AND THE NEW RULES OF LIFTING FOR WOMEN





“Durability is More Important than Ability”



Questions
are
guaranteed in
life;
Answers
aren't.

Thank you!