

I) Principles of the Functional Approach - the keys to long term athletic sustainability

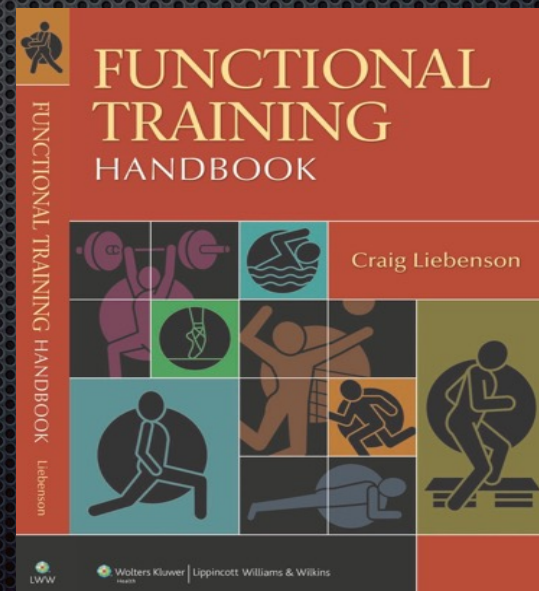
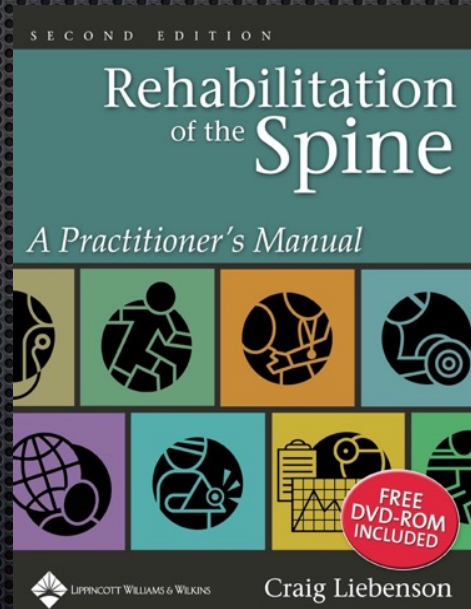
March, 2017 | CRAIG LIEBENSON, D.C.

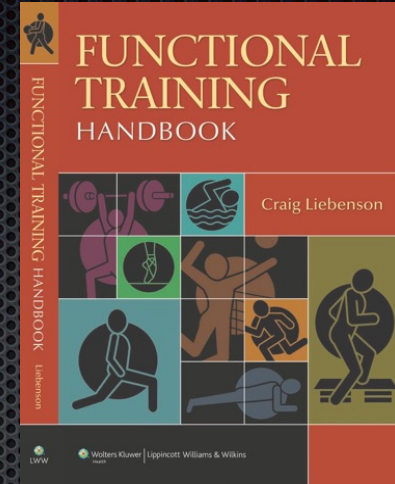
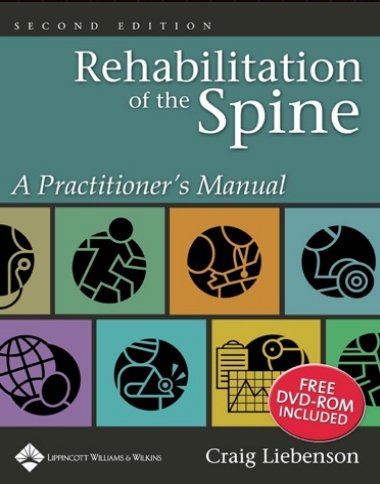
Craig Liebenson, D.C.

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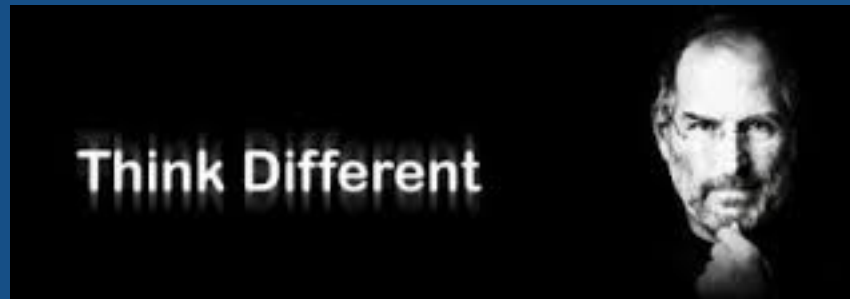




cliebenson - Instagram
craigliebenson - Twitter
Prague School to Athletic
Development - Facebook
LA Sports & Spine - Facebook
#PS2AD
#hardestthingyoudowell
#athleticsustainability



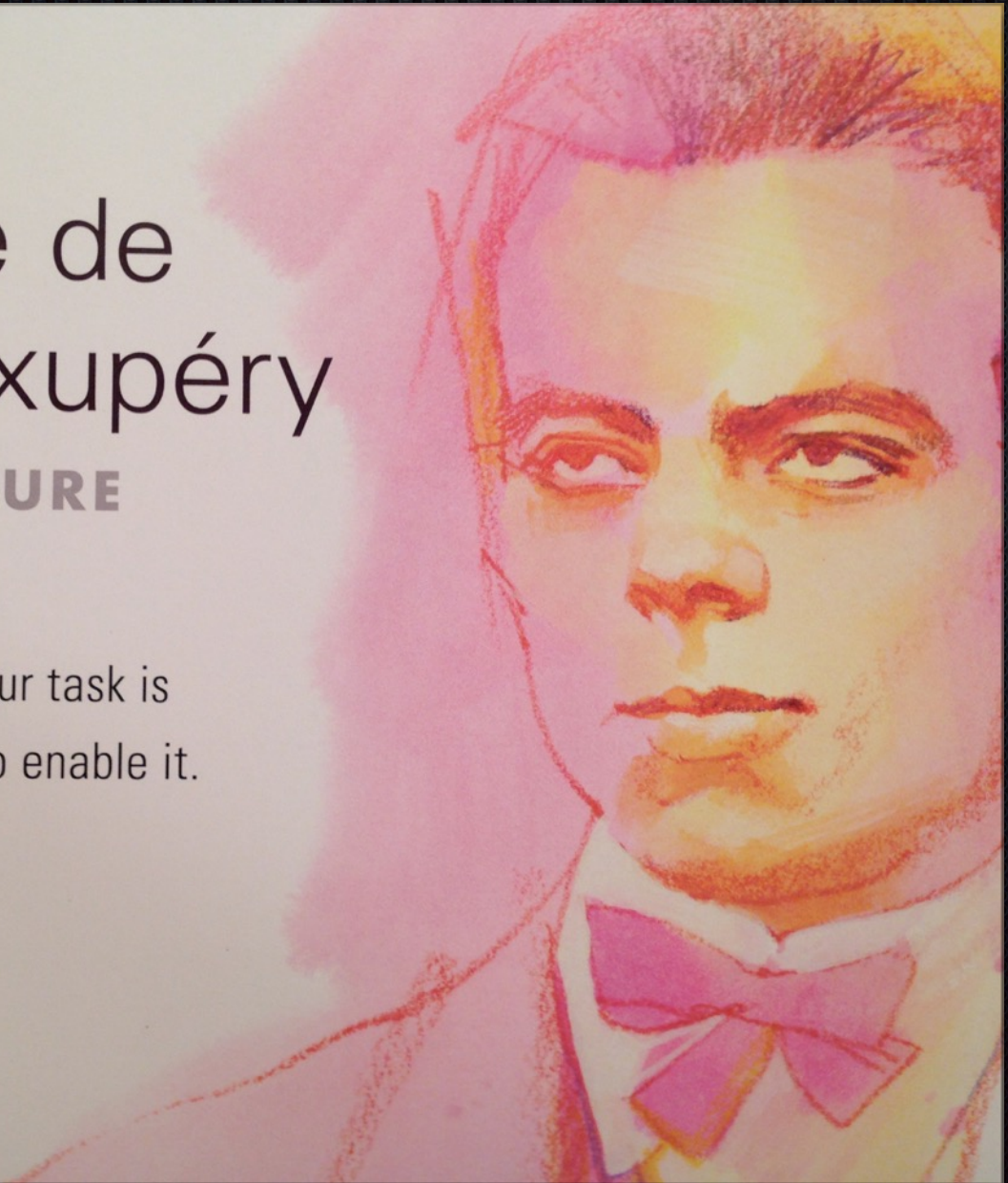
Can We Predict Future Pain or Injury?



Antoine de Saint-Exupéry

ON THE FUTURE

As for the Future, your task is
not to foresee, but to enable it.



PREVENTION VS PREDICTION

TIMOTHY E. HEWETT, PhD¹

Prediction of Future Injury in Sport: Primary and Secondary Anterior Cruciate Ligament Injury Risk and Return to Sport as a Model

J Orthop Sports Phys Ther 2017;47(4):228-231. doi:10.2519/jospt.2017.0603

PREVENTION VS PREDICTION

**Why screening to predict
injury risk is a waste of time...**

Roald Bahr MD PhD

Professor & Chair | Oslo Sports Trauma Research Center

Chief Medical Officer | Norwegian Olympic Training Center

Head | Aspetar Injury & Illness Prevention Program (ASPREV) | Aspetar

 Oslo Sports Trauma
RESEARCH CENTER

PREVENTION VS PREDICTION

THE MORE COMPLEX AND MULTIFACTORIAL THE HAMSTRING PREVENTION PROGRAM, THE BETTER

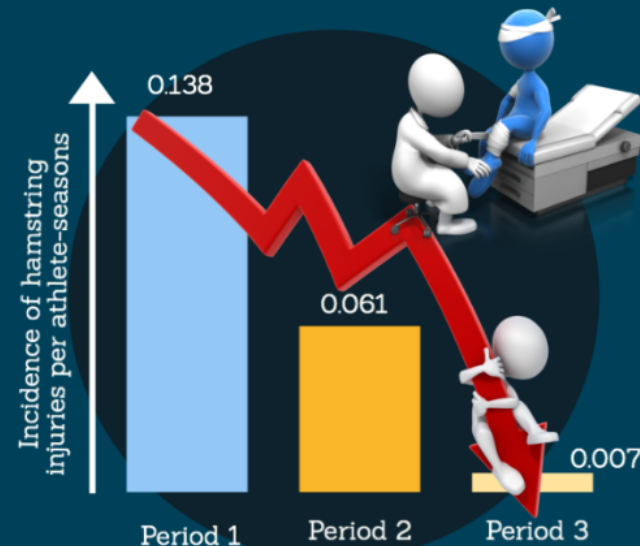
Reference : by Y. Sugiura et al. OJSM, 2017

Designed by @YLMsPortScience

613 collegiate male sprinters were trained by the same coach over 24 seasons. The hamstring injury prevention program evolved over time. The incidence of hamstring injuries was compared for each of the 3 prevention strategies

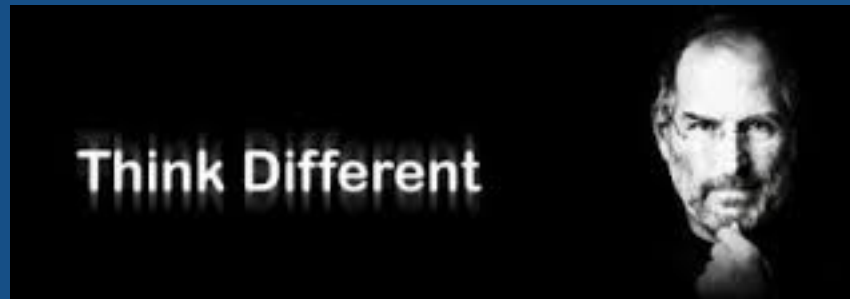


	Period 1	Period 2	Period 3
Strength			
Weight machine	✓	✓	✓
Body weight (eccentric)			✓
Agility			
Ladder		✓	✓
Mini-hurdle		✓	✓
Flexibility			
Dynamic stretching			✓



The incidence of hamstring injuries in sprinters decreased as agility, further strength exercises, and flexibility were incorporated into a prevention program that already included strength training

Does Structural Pathology Correlate w/ Symptoms?



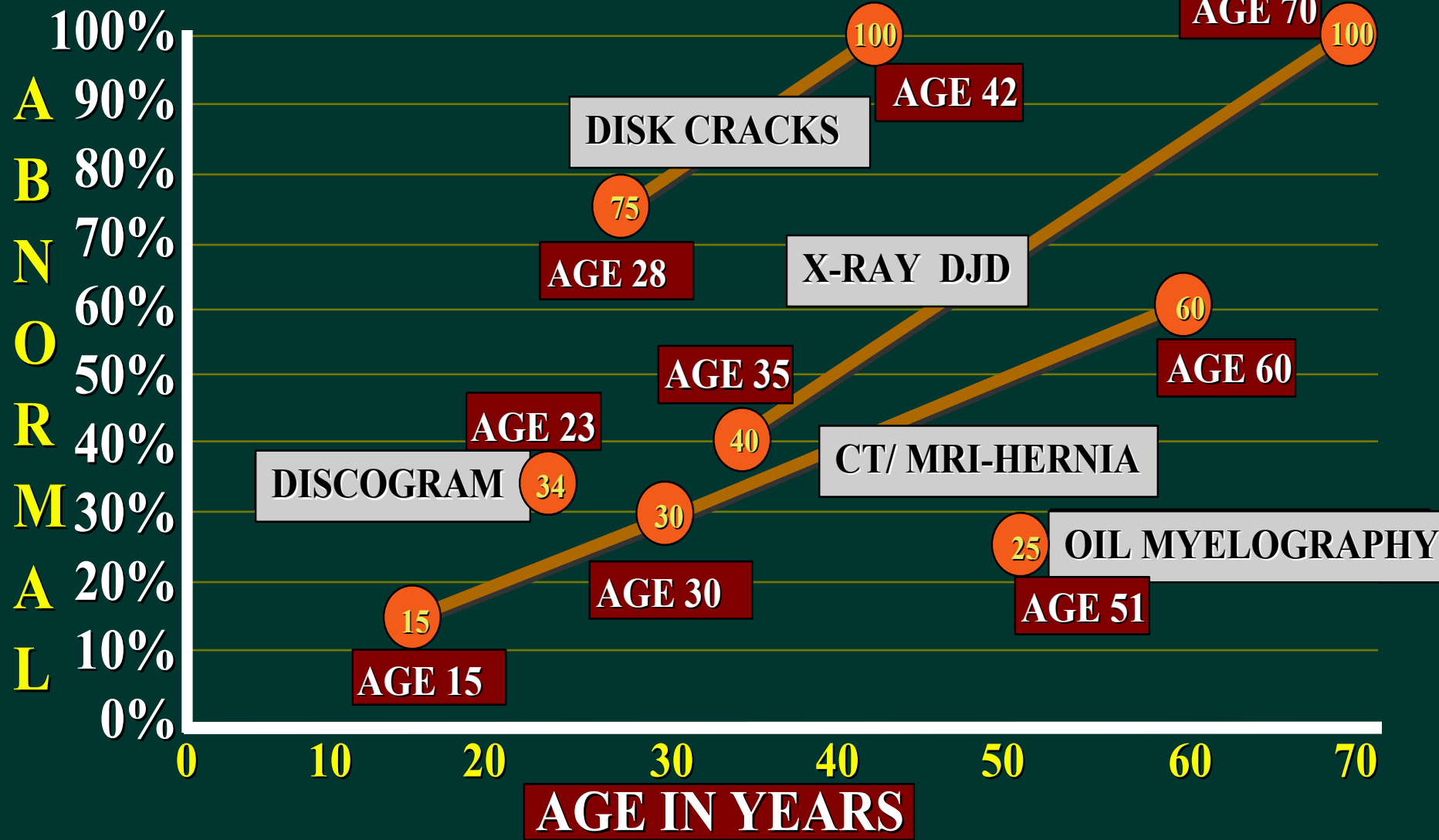
MORE IMAGING CENTERS A GOOD THING?



- Researchers at Stanford University found (Baras):
 - More imaging centers
 - More MRI's ordered
 - More Surgeries Performed



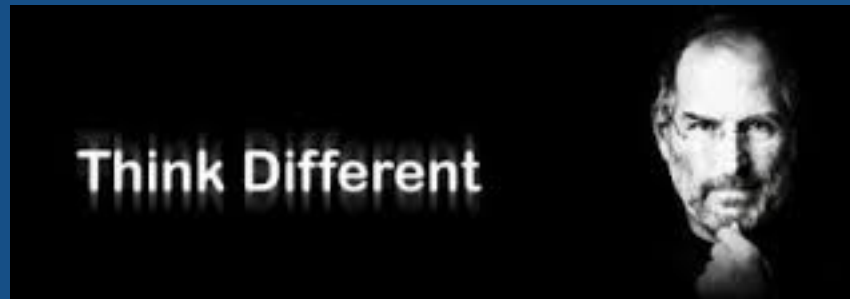
DISC FINDINGS IN NORMAL SUBJECTS



Find your age on the Age in Years line then look up the chance of a findings being present before your symptoms begin.



**Don't we need to do
passive care 1st?**



Is Bed Rest the Answer?

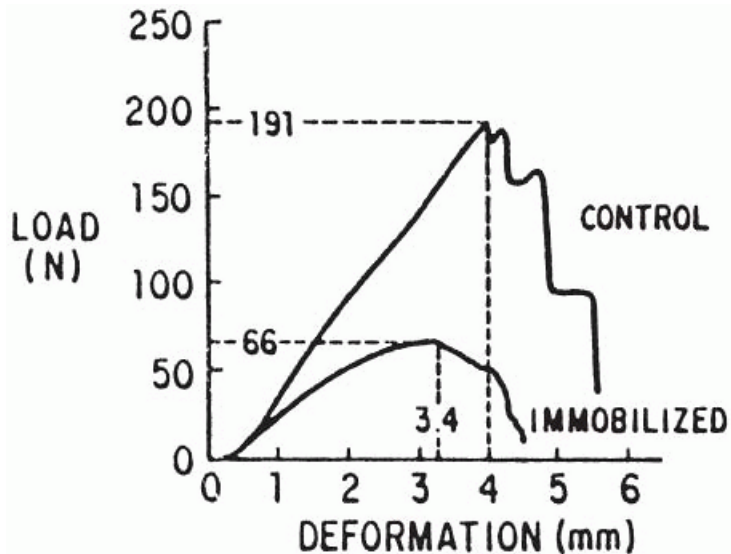


Figure 1.12 The strength of rested tissue deteriorates dramatically compared to normal tissue. In this medial collateral ligament of a rabbit knee that rested for 9 weeks, two-thirds of the strength has been lost. From Mooney V. The subacute patient: To operate or not to operate. In: Mayer TG, Mooney V, Gatchel RJ, eds. Contemporary Conservative Care for Painful Spinal Disorders. Baltimore: Lippincott, Williams & Wilkins, 1997.



SCIATICA



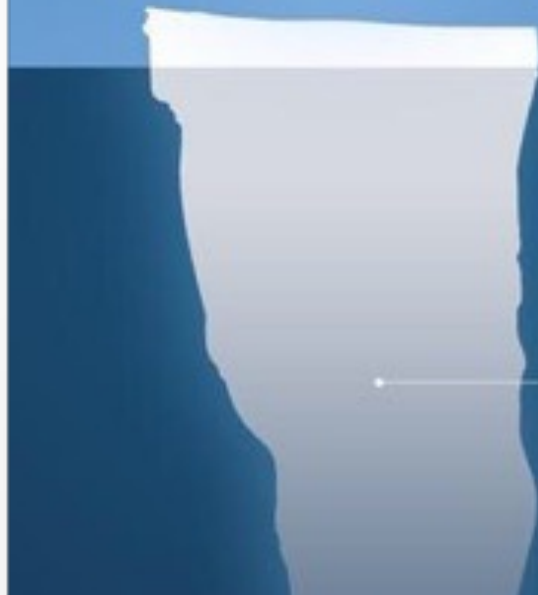
- Passive modalities not effective
- Results for surgery are conflicting
- Active conservative treatment effective
- *Albert HB, Manniche C. The efficacy of systematic conservative treatment for patients with severe sciatica. Spine 2012;37:531-542.*

EXERCISE IS MEDICINE

"You are *already* your own doctor."

Tom Ferguson, M.D., 1985

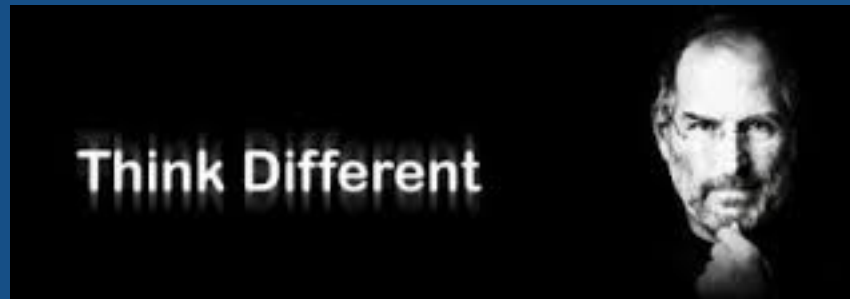
Our interactions with
the healthcare system are
only the tip of the iceberg.



Self-care

is and has always been
our predominant
form of health care.

What Happens When Threat Goes Up?



Words can cause serious harm.

We all need be careful with the language we use

Examples given by patients of explanations provided by Healthcare Professionals to explain the cause of their pain & symptoms

"Your acromion is causing your pain by ripping into your tendon"

"Your tendon is very frayed and damaged"

"Your symptoms are coming from your (rotator cuff) tear"

"If we don't operate on your small tear it will get so big, we won't be able to repair it"

"Your posture has changed your shoulder blade position & causing your impingement"



Lichtenstein Crying Girl 1963

[http://www.mskscienceandpractice.com/article/S1356-689X\(16\)00040-0/abstract](http://www.mskscienceandpractice.com/article/S1356-689X(16)00040-0/abstract)

@JeremyLewisPT

www.LondonShoulderClinic.com

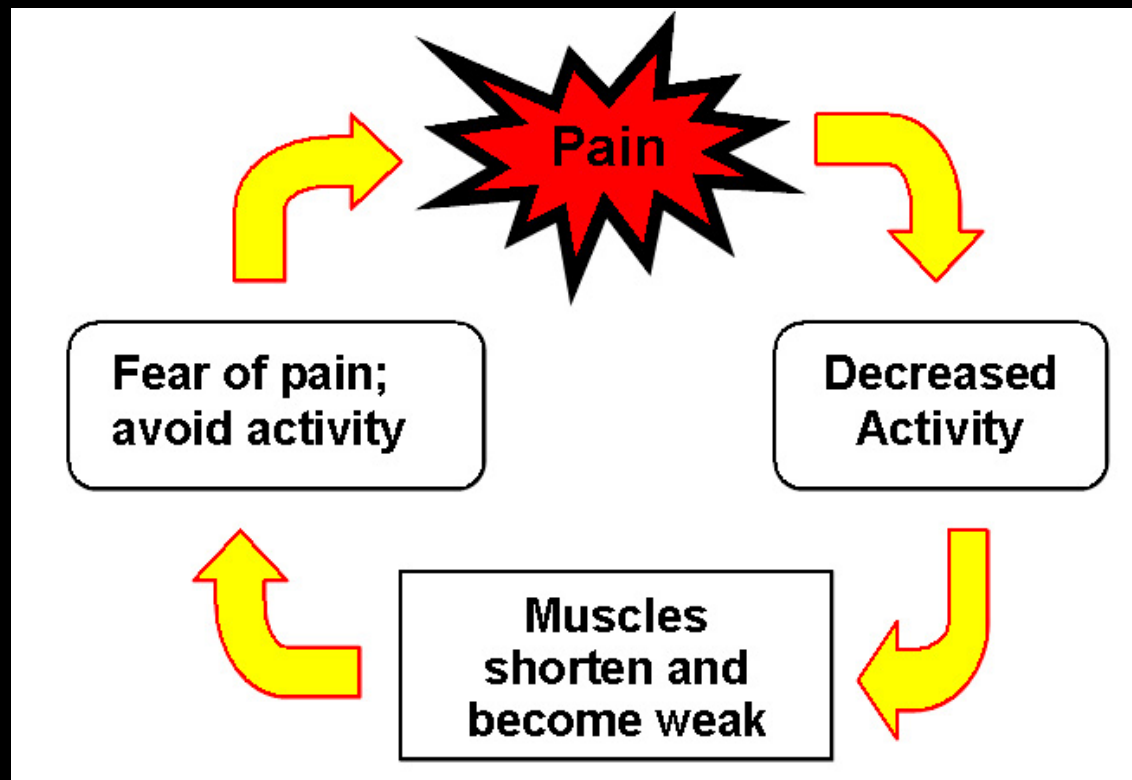


STRESS



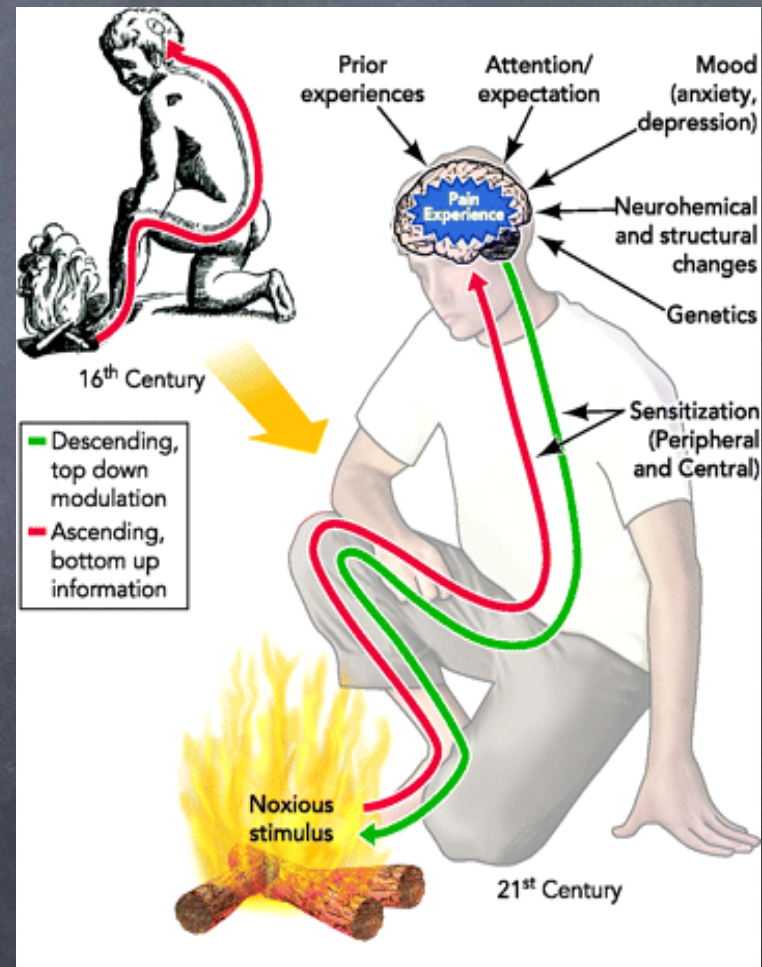
- **Perceived** danger/**threat** → ↑
cortisol





Pain Neuro-Matrix

● Up & Down-regulation



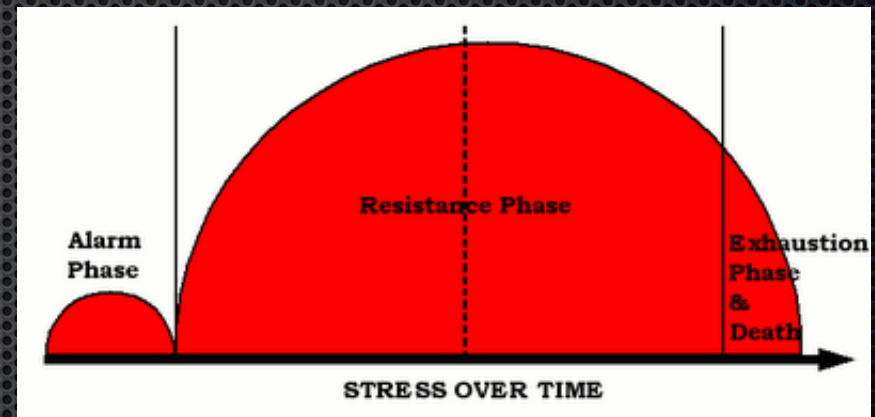
HAWAII -Emmy Werner

- 32 year study of “at risk” children
- 2/3 of the “at risk” developed serious learning or behavior problems
- 1/3 did not - WHY?

George Bonanno - Columbia

Loss, Trauma & Emotion Lab

- ✧ We all have a fundamental stress-response system
- ✧ Central element of resilience is **PERCEPTION**



PERCEPTION

- ✦ Do you conceptualize an event as traumatic, or as an opportunity to grow?
- ✦ **PTE - Potentially Traumatic Event**

Stressful or Traumatic Events **ARE NOT PREDICTIVE**

- ✦ *“The prospective epidemiological data shows that exposure to PTEs does not predict later functioning”*

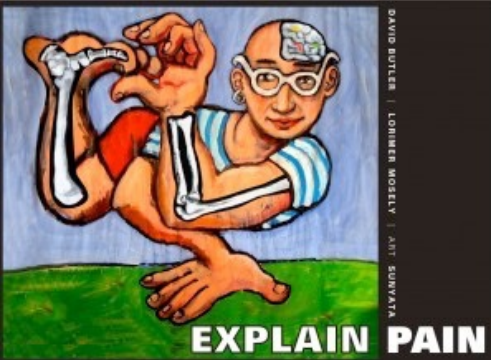
RESILENCY

- **Phoenix**
 - Bounces back
 - Springs back
 - *Norman Gemenzy - U Minn*
 - Study of
“protective factors”



We can make ourselves less vulnerable

- ✦ Columbia Neuroscientist - Kevin Oscher
- ✦ Reframe stimuli in positive terms changes HOW people EXPERIENCE & REACT to stimulus



WHY?

Guarding after an injury is normal

- *“after an injury tissues heal, but muscles learn, they readily develop habits of guarding that outlast the injury”*

Janet Travell, MD

White House Physician,
President John F Kennedy



Is the problem we see Hardware (structural) or Software (functional)?

Windows 2000 Advanced Options Menu
Please select an option:

Safe Mode

Safe Mode with Networking

Safe Mode with Command Prompt

Enable Boot Logging

Enable VGA Mode

Last Known Good Configuration

Directory Services Restore Mode (Windows 2000 d

Debugging Mode

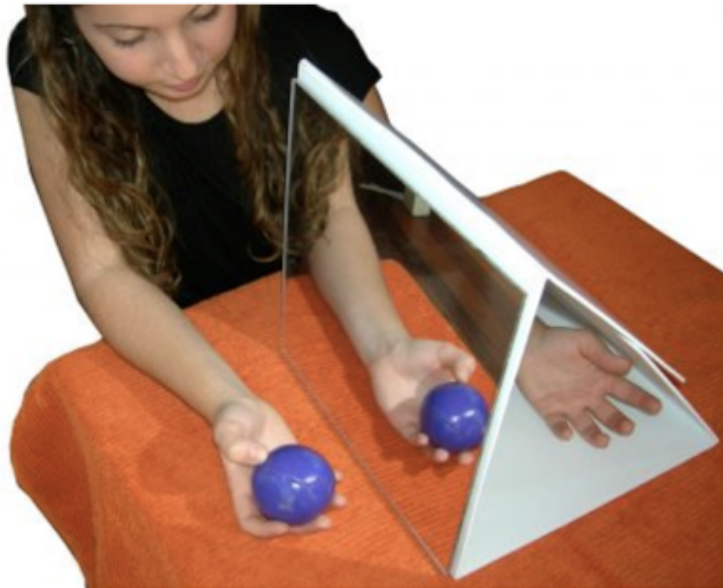
Boot Normally

Use ↑ and ↓ to move the highlight to your choice.
Press Enter to choose.





Neural Adaptation- Myelination Workshops



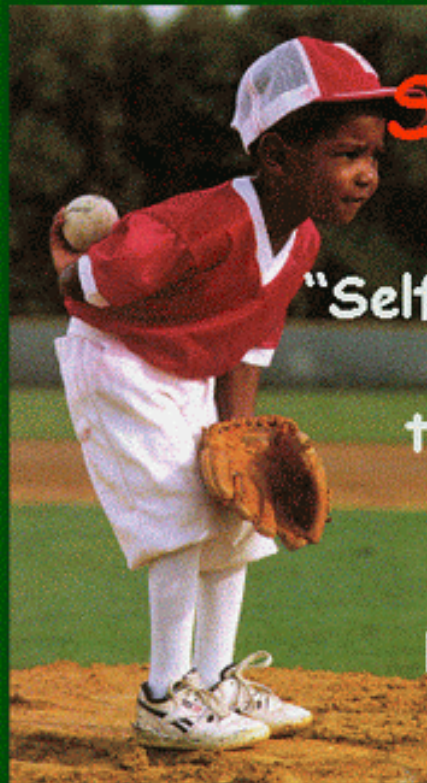
**POWER IS NOTHING
WITHOUT CONTROL.**

*Patients w/ pain
need the right kind
and amount of
movement!*

You can train people to regulate their emotions

- ✦ Martin Seligman - UPenn - **Learned Optimism**
- ✦ **Changing from external locus of control to internal**
- ✦ “Resilience is a set of skills that can be taught”

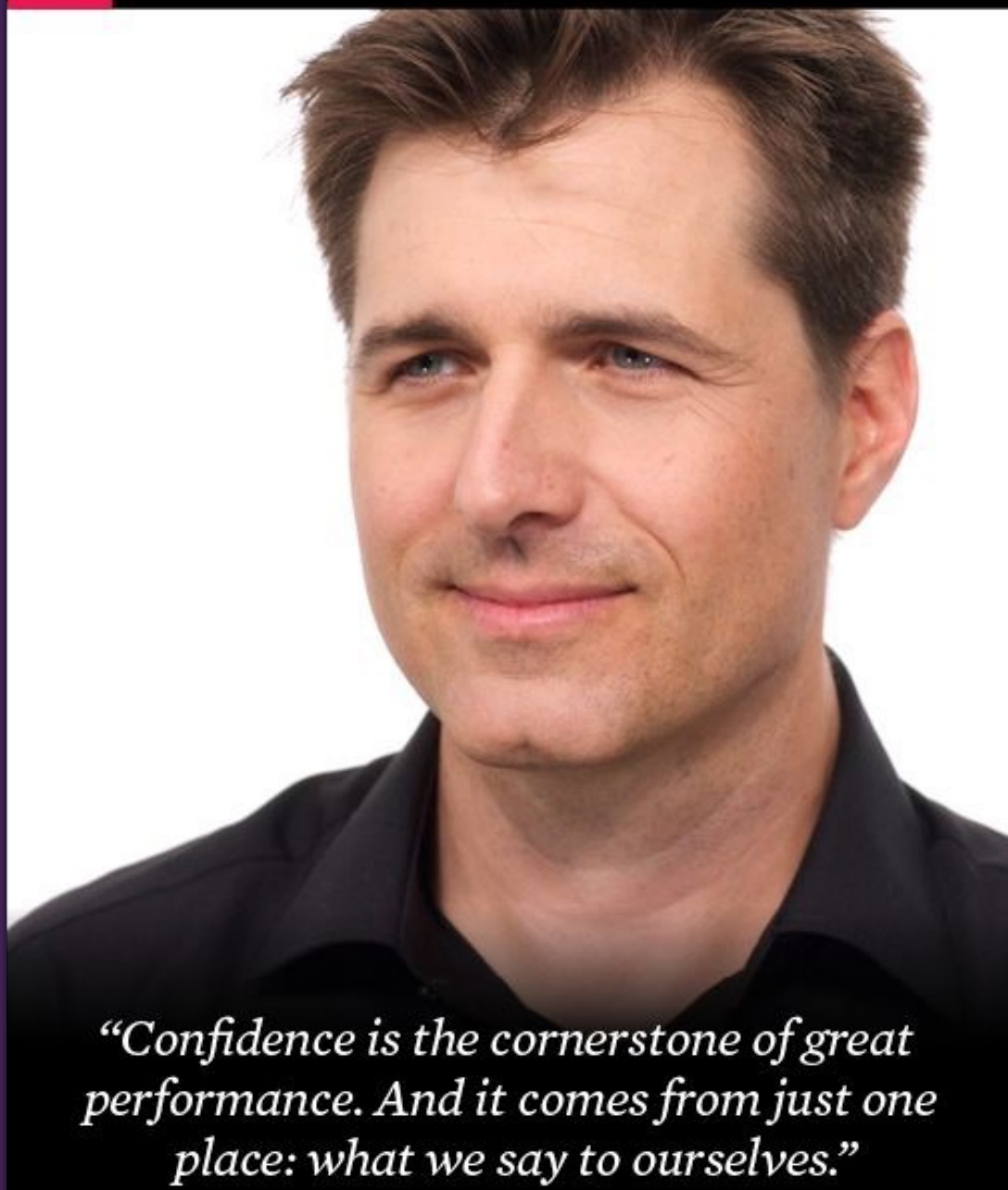
THE HOW



SELF-EFFICACY

"Self-efficacy is the *belief* in one's capabilities to organize and execute the sources of action required to manage prospective situations."

Bandura, 1986



“Confidence is the cornerstone of great performance. And it comes from just one place: what we say to ourselves.”



DR KAREL LEWIT

April 25, 1916 to Oct 3, 2014

4 PRINCIPLES of The Functional Approach

1. **QUALITY > QUANTITY** - JANDA 101
- “every exercise is a test”
2. **NO PAIN** - not “boot camp” - <3/10
3. **“THE HARDEST THING YOU DO WELL”** - Modern Load Management
- Competent Capacity
4. **INTEGRATED APPROACH** -
“SILENT KILLER” - painless dysfunction



*"I don't begin treatment until I have examined everything.
I must see a picture. The key link can be from a **past**
trauma, repetitive strain, or a **dysfunctional key**
area."*

EVERYTHING IS CONNECTED

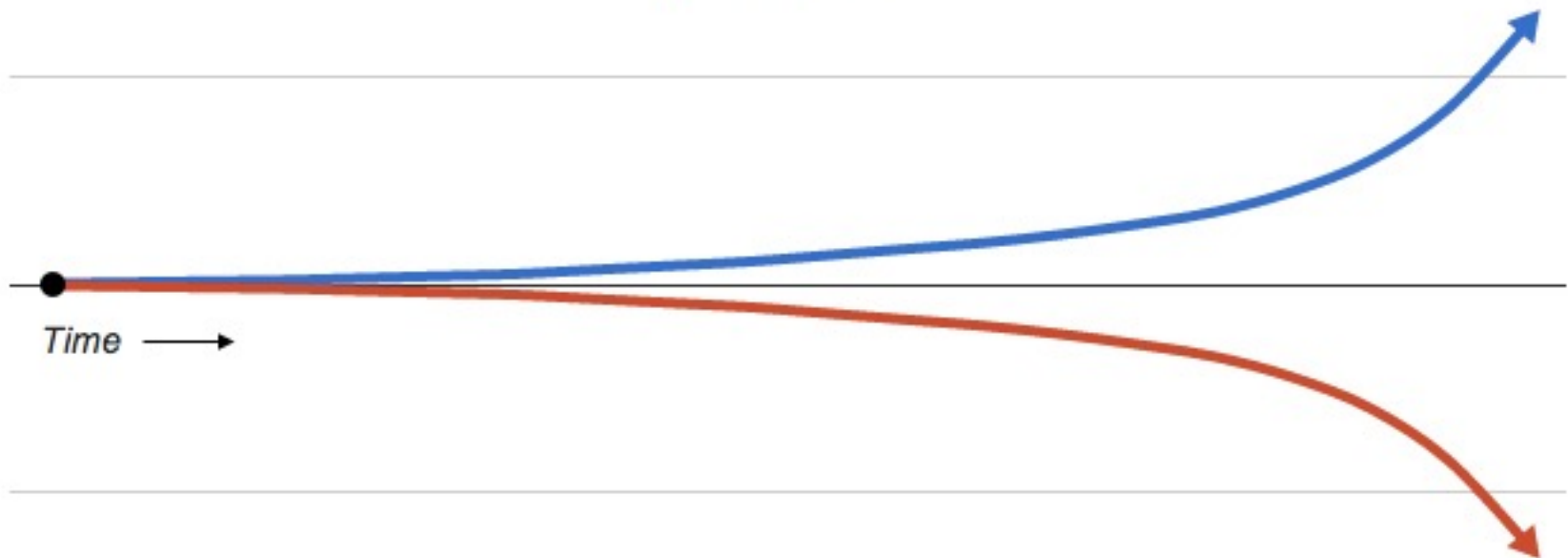
- JANDA PROVED that ankle sprain causes faulty activation of the gluteus maximus on the injured side
- WHICH PERSISTS AFTER INJURY HAS HEALED

*Bullock-Saxton JE, Janda V, Bullock
MI: Int J Sports Med 15: 330-334,
1994*



Aggregation of Marginal Gains

- 1% Improvement
- 1% Decline

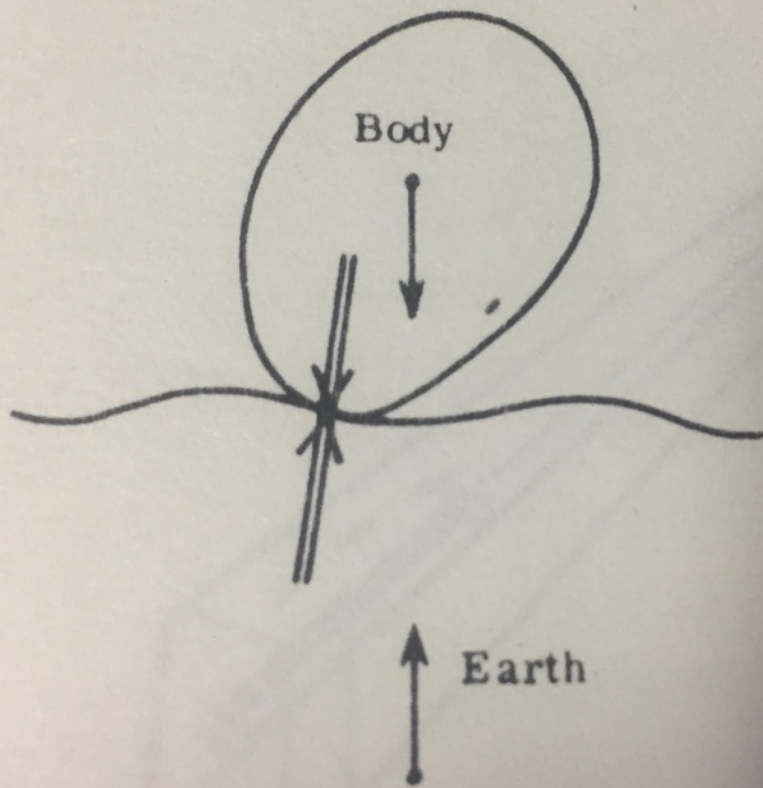




90:90 Shin Box Get-Up

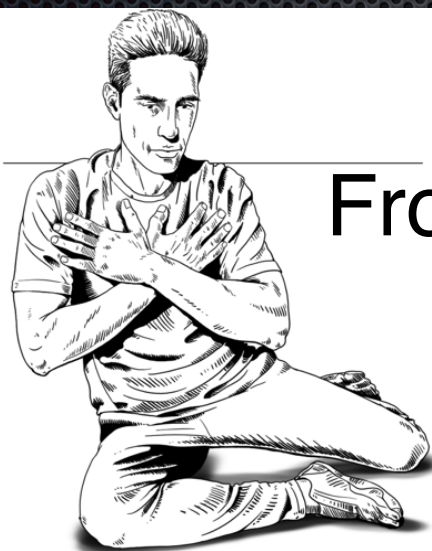


Issac Newton

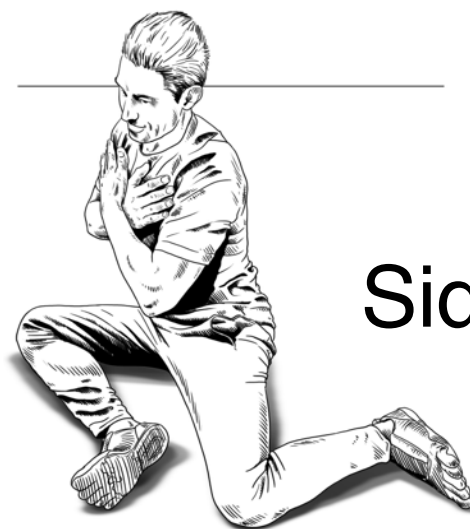


REGRESSION



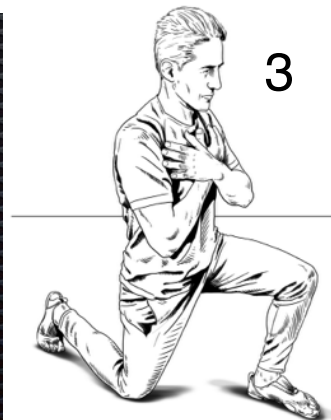


Front



Side





Different Angle

1 Leg Balance Test – p248-249, 807-809

- Maribo T, Iverson E, Andresen N, Stengaard-Pedersen K, Schiottz-Christensen B. Intra-observer and interobserver reliability of one leg stand test as a measure of postural balance in low back pain patients. *Int Musc Med* 2009;31:172-177



Balance

- **Score**
 - Max time 30s
 - Record time when:
 - Hop
 - Move foot
 - Reach out & touch something with either hand

SHIN BOX TO CRAWLING



Instructor: Michael Truc

Sagittal

Transverse

Frontal

**Multi-
Planar
Inline 1/2
Kneeling
Halo**



Full Squat



Dan John Partner Squat



I) Mindset

IMPROVEMENT

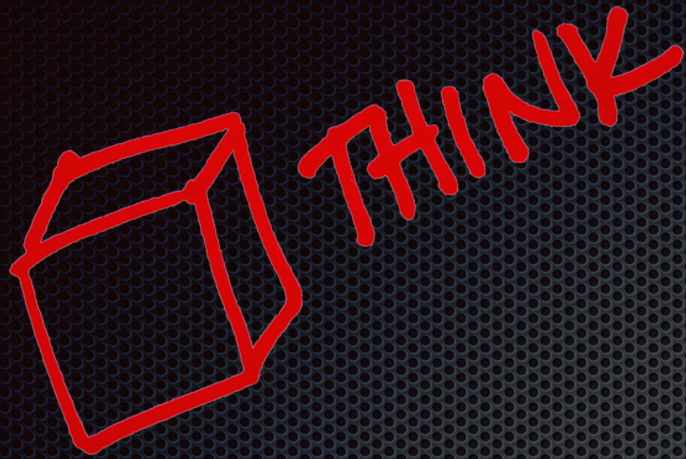
That's what it comes down to.

Our mission is to empower you.

And improve your performance.

THINK





Steve Jobs

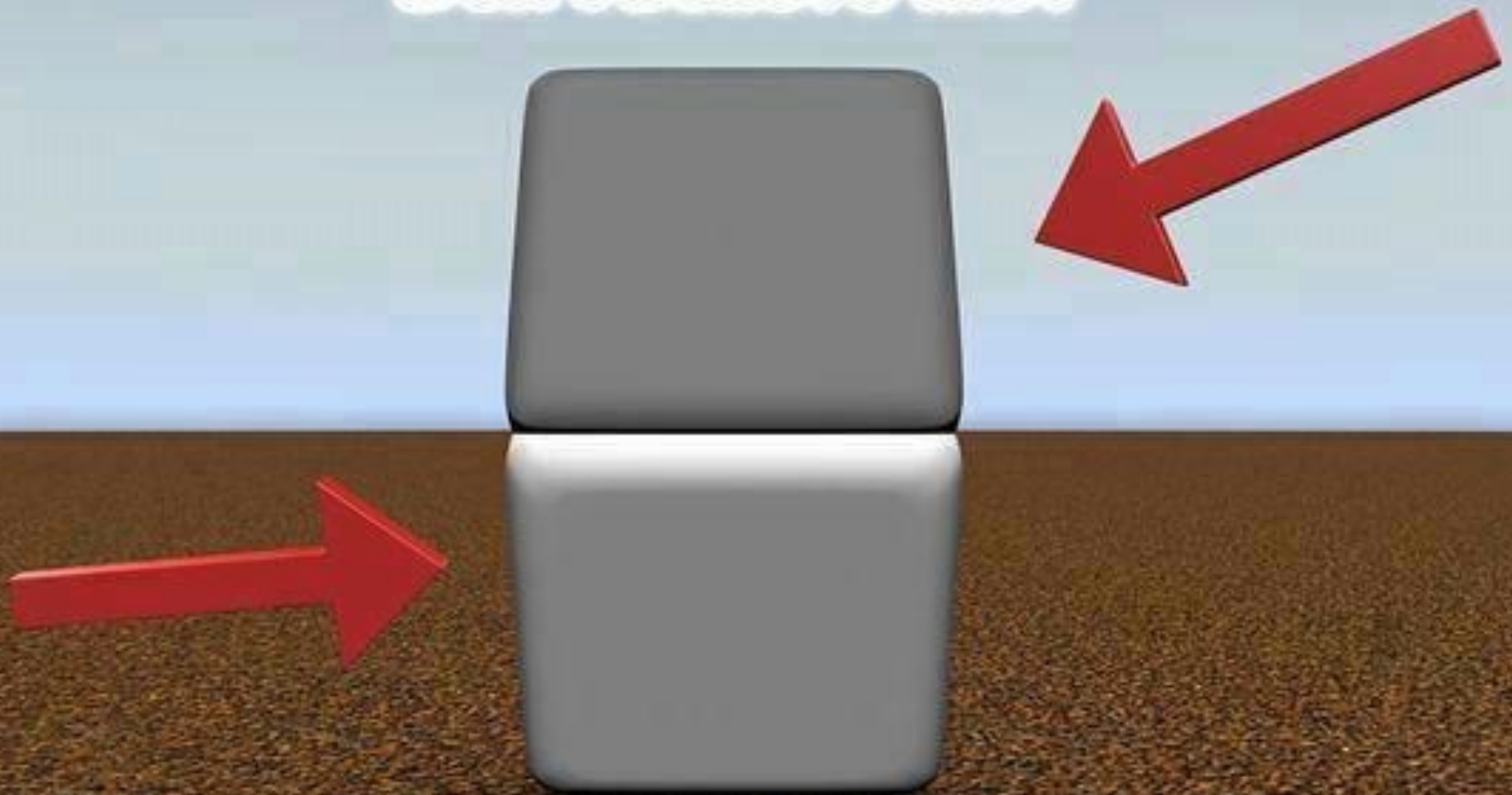
- **Challenge the “Status Quo”**



Think Different

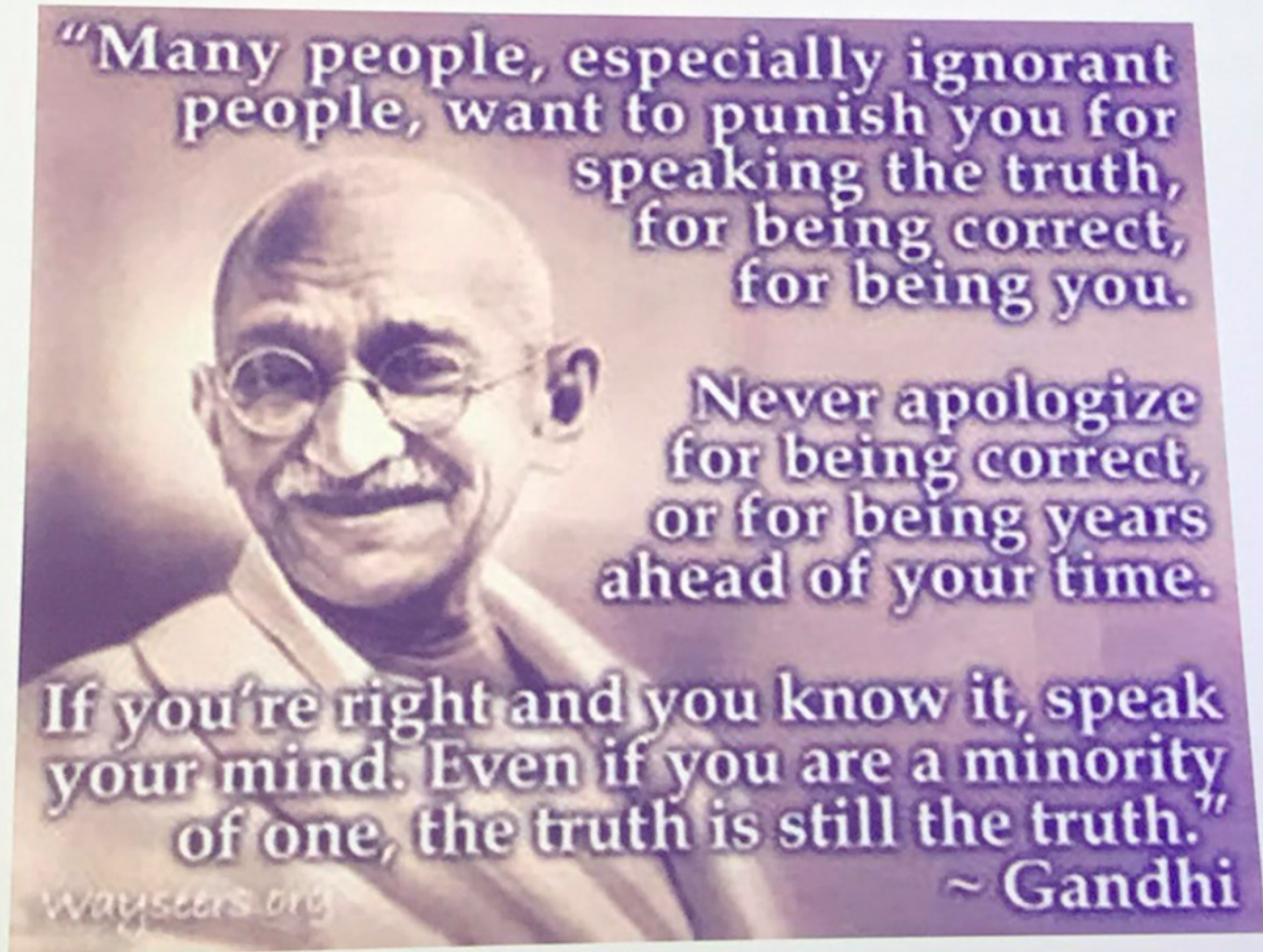


The Boxes are the same color.
Don't believe me?



PUT A FINGER ACROSS THE MIDDLE OF THE PAGE
AND SEE FOR YOURSELF.

Obligation to the Truth





- “The wise man is one who, knows, what he does not know.”

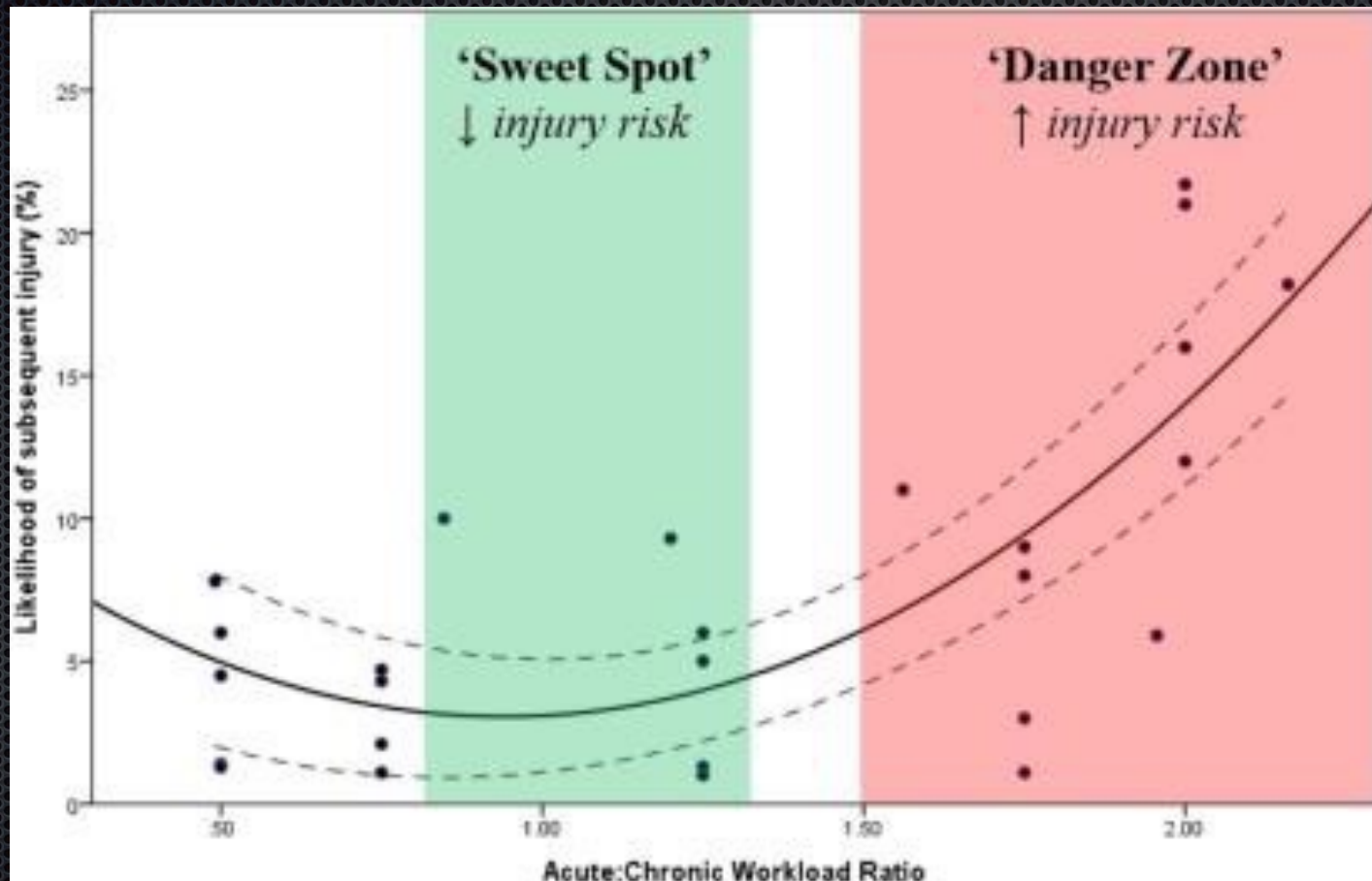
— Lao Tzu, Tao Te Ching



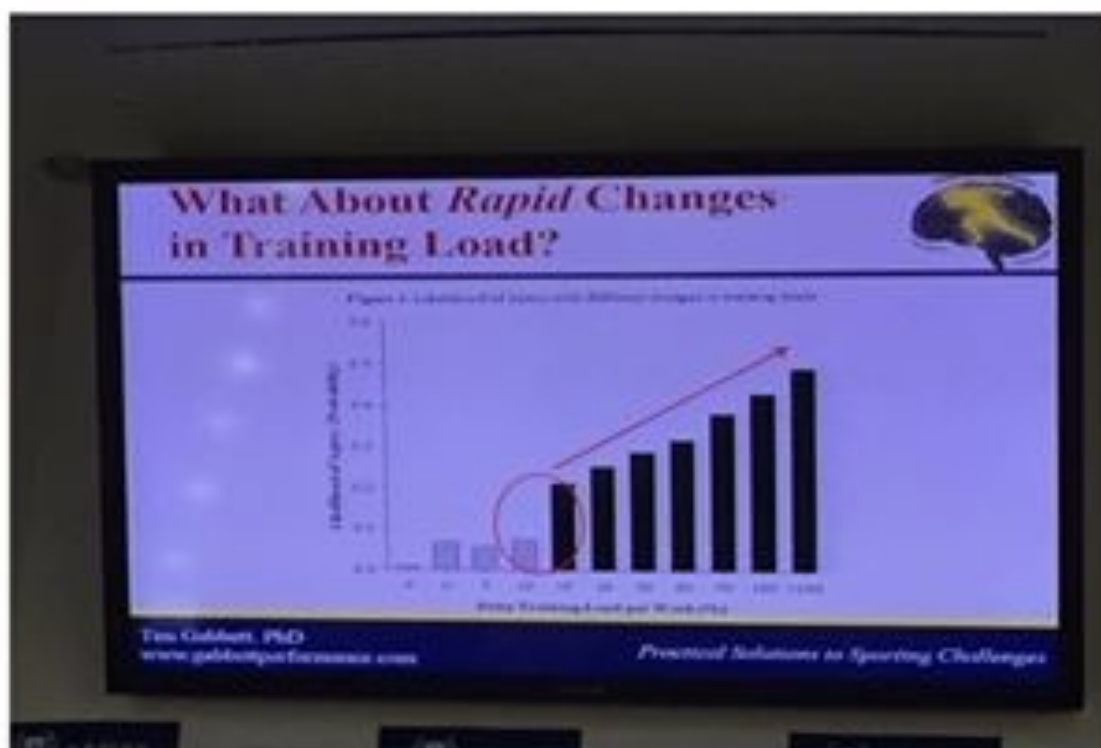
II) Load Management

Too little
too late

Too much
too soon

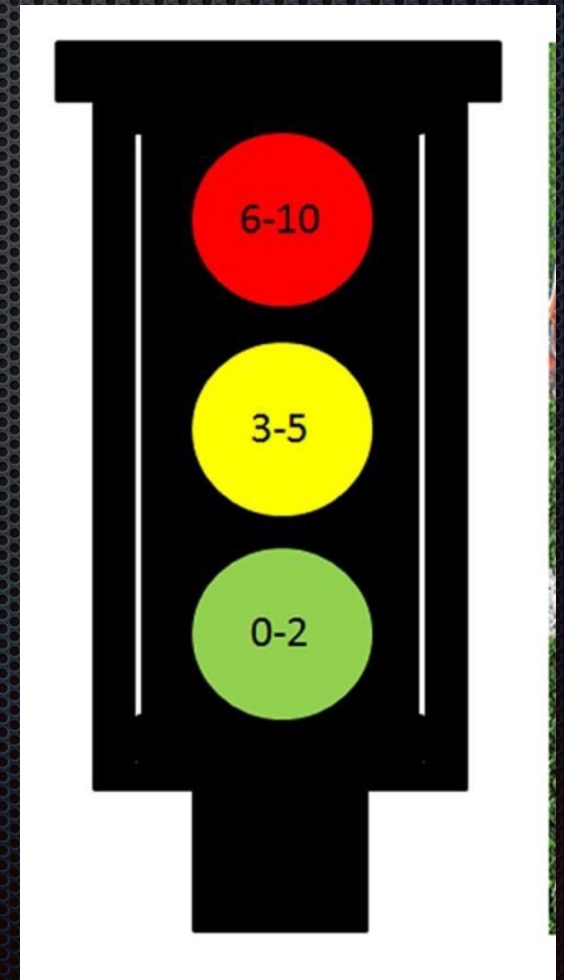


Weekly changes of training load greater than 10% lead to increased likelihood of injury @TimGabbett #TrainingLoad16



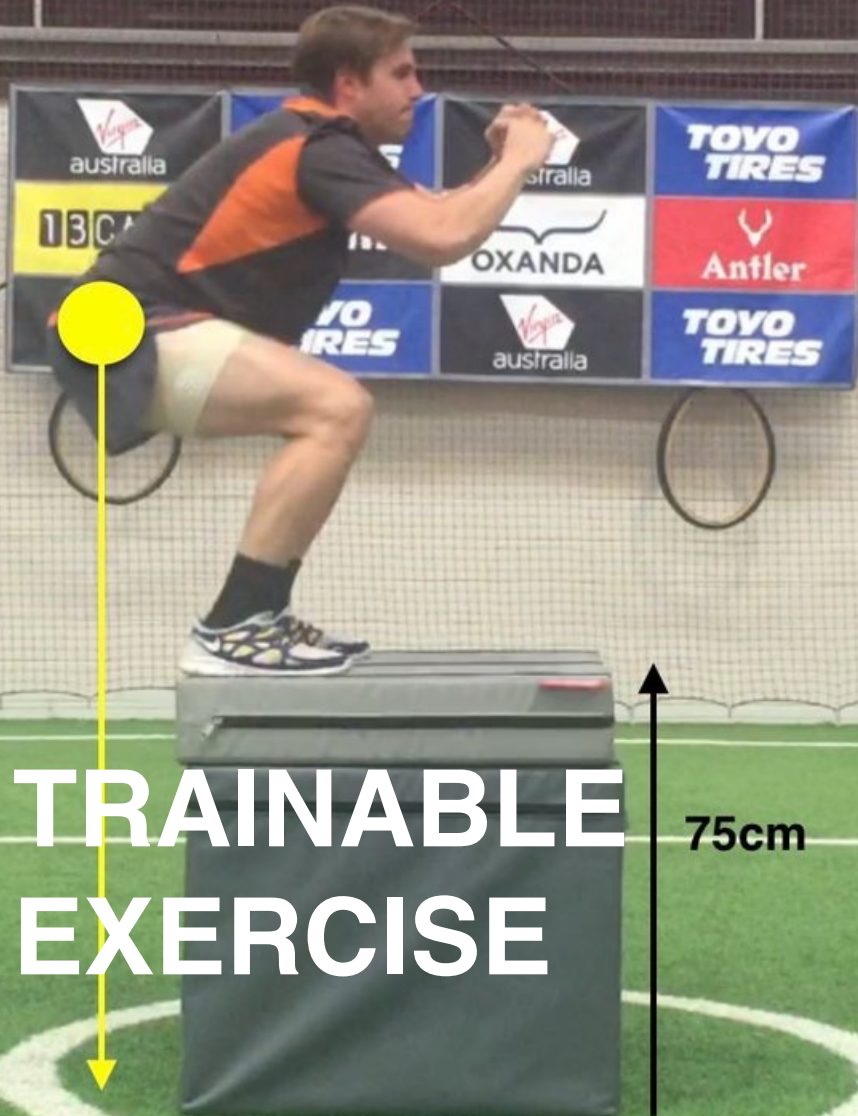
Bridge the Gap between Science & Clinic

- ✦ We have underloaded or de-loaded people too much
- ✦ Need to increase chronic load gradually
- ✦ No more than 10%/week
- ✦ Don't load dysfunction or pain



III) Trainable Menu

Both jumps achieve the same hip displacement - which one improves mechanics?



**TRAINABLE
EXERCISE**

75cm



**FEAT OF
STRENGTH**

105cm

**"building a menu for
each athlete of
trainable versions
of exercises"**

Chris Chase, Atlanta Hawks

NBA

#LASPORTS&SPINE



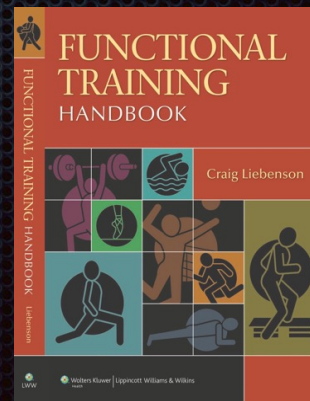
"Different movement components get emphasized in different programs, but there are some components that should always be present."

Lachlan Wilmot,

#LASportsandSpine



TRAINABLE MENU



Marginal Gains Process

IAD



IDENTIFY

Identify key
characteristics



ANALYSE

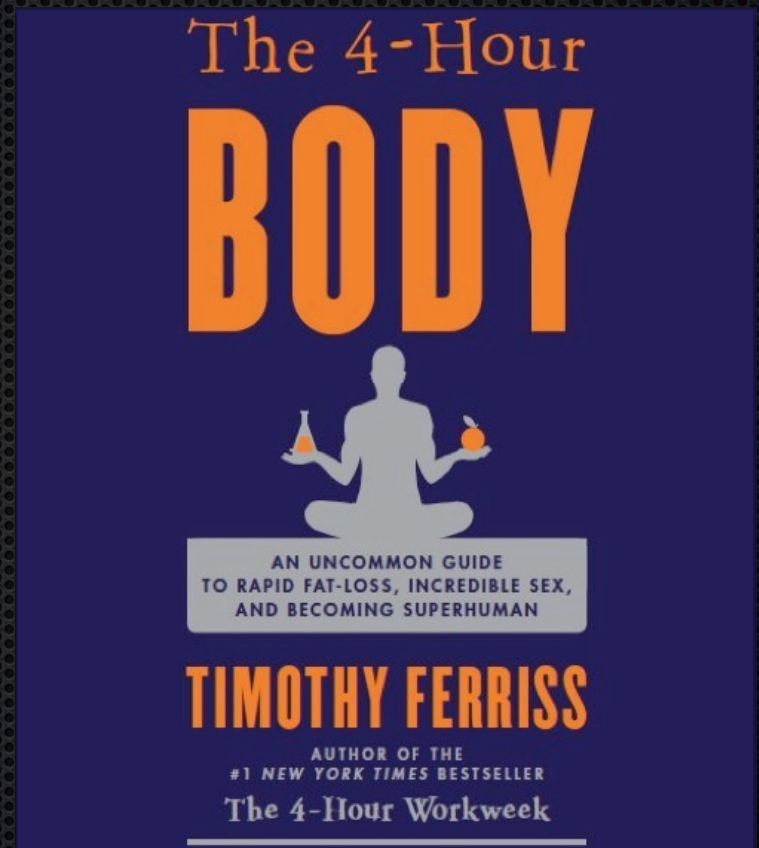
Analyse how evident
these characteristics
are & assess their
impact on learning



DEVELOP

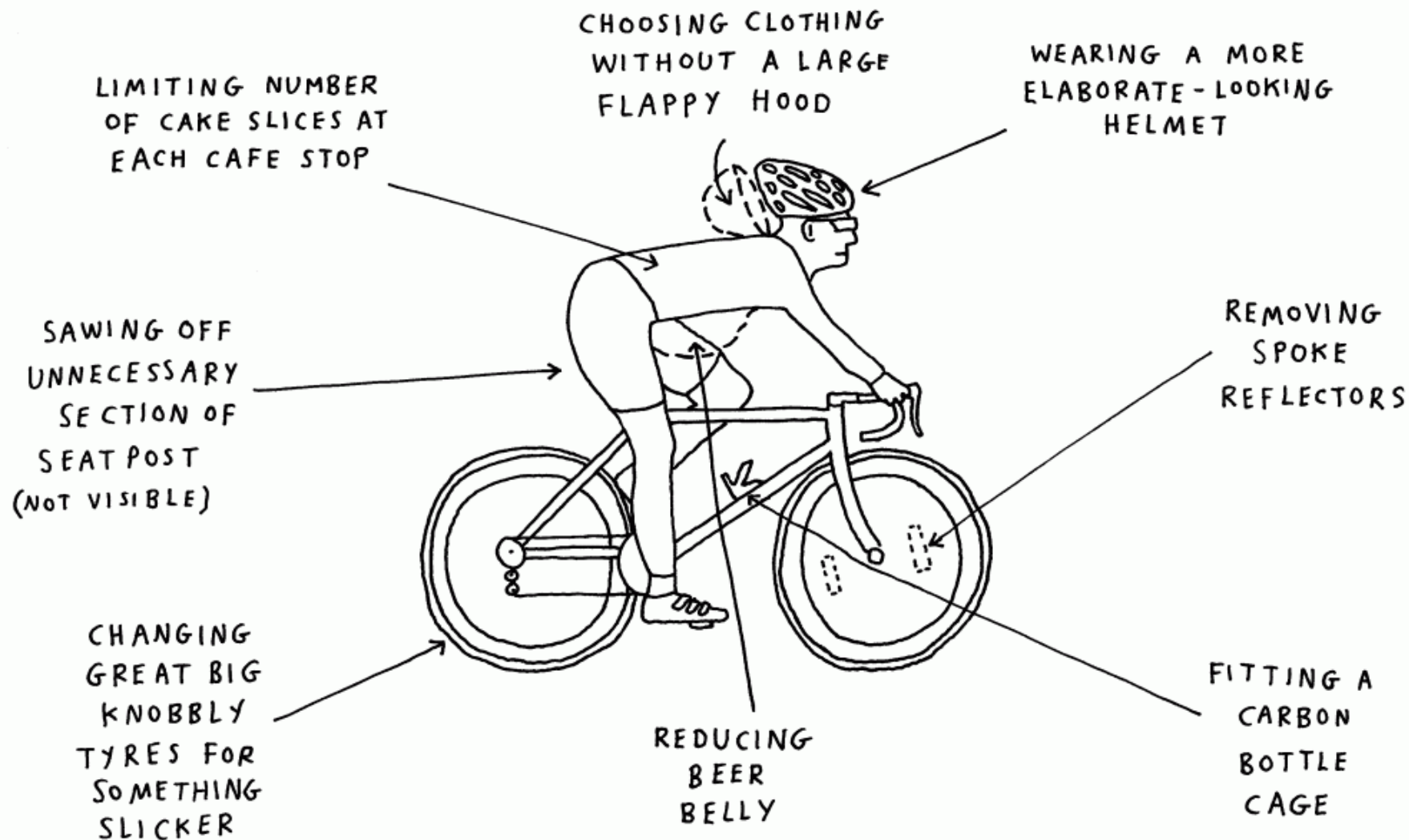
Deliberately develop
the high impact
characteristics

"Lack of time is lack of priority... **80% of positive outcome can be traced back to 20% of your efforts..** identify that 20%, free up some time, and do things that make you happy" –Timothy Ferriss



MARGINAL GAINS

HOW THE PROFESSIONALS MAKE SMALL CHANGES TO IMPROVE THEIR PERFORMANCE



Keep it simple

- Learn the buckets - the METHODS - develop your craft
 - ✦ SQUAT (2/1)
 - ✦ HINGE (2/1) (DL/Swing)
 - ✦ SPLIT STANCE (Lunge)
 - ✦ PUSH (BP, MP)
 - ✦ PULL (Row, Climb)
 - ✦ CARRY (KB)



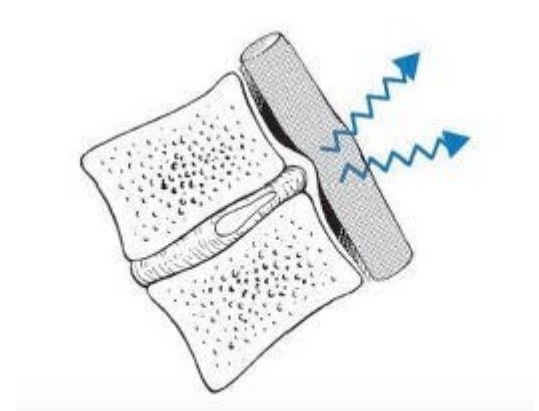
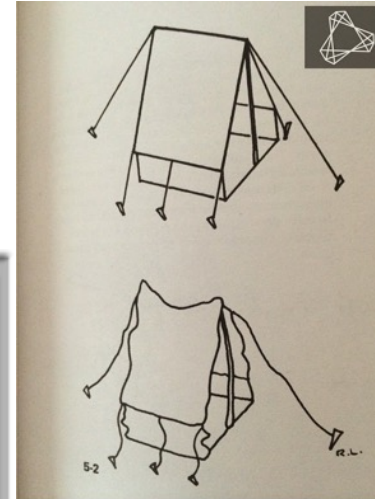
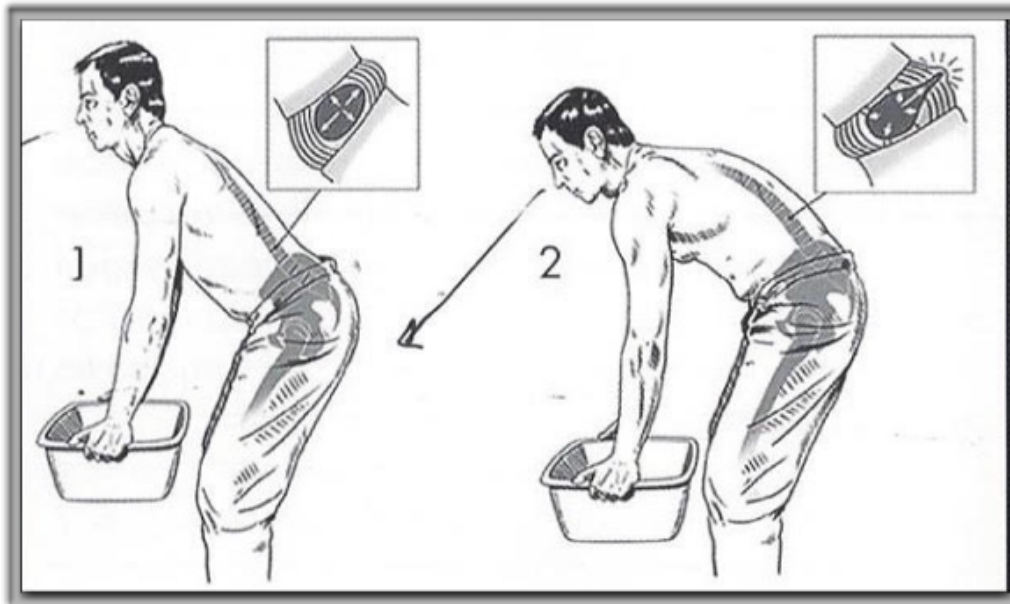
IV) Don't Load Dysfunction



**Janda's
Approach**

“every exercise is a test”

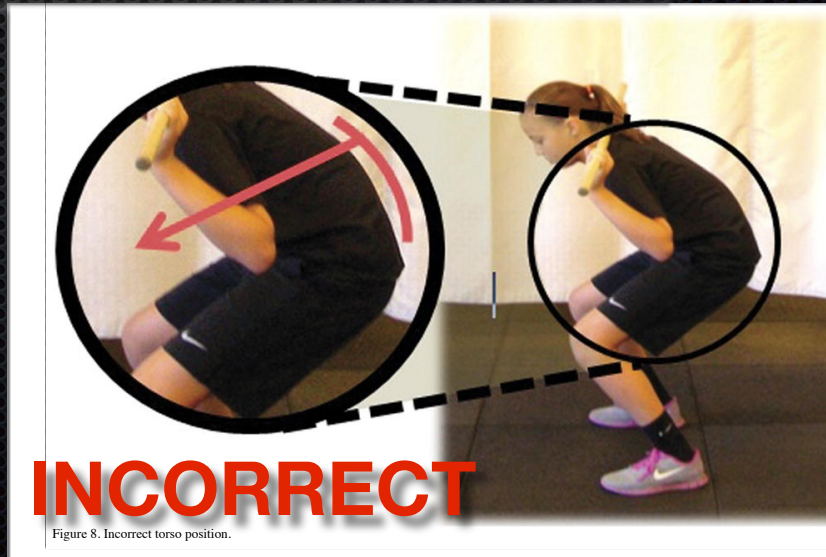
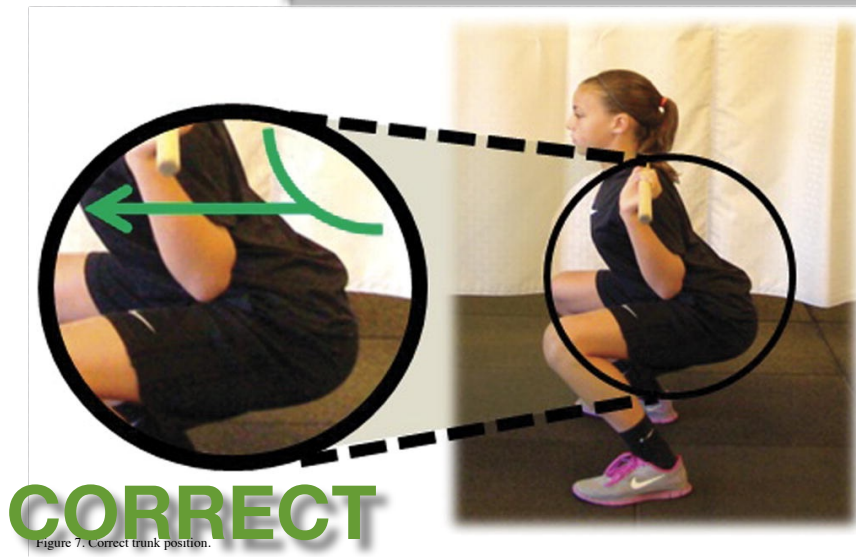
SUSTAINABLE ATHLETICISM



The Back Squat: A Proposed Assessment of Functional Deficits and Technical Factors That Limit Performance

Gregory D. Myer, PhD, CSCS*D,^{1,2,3,4} Adam M. Kushner, BS, CSCS,¹ Jensen L. Brent, BS, CSCS,⁵
Brad J. Schoenfeld, PhD, CSCS, FNCSA,⁶ Jason Hugentobler, PT, DPT, CSCS,^{1,7}
Rhodri S. Lloyd, PhD, CSCS*D,⁸ Al Vermeil, MS, RSCC*E,^{9,10} Donald A. Chu, PhD, PT, ATC, CSCS, FNCSA,^{10,11,12}
Jason Harbin, MS,¹³ and Stuart M. McGill, PhD¹⁴

3/17/2015 journals.lww.com/nsca-sci/_layouts/oaks.journals/imageView.aspx?i=nsca-sci/2014/12000/00002&i=FF17&year=2014&issue=12000&article=00002

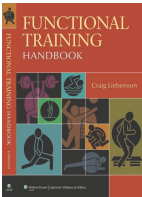
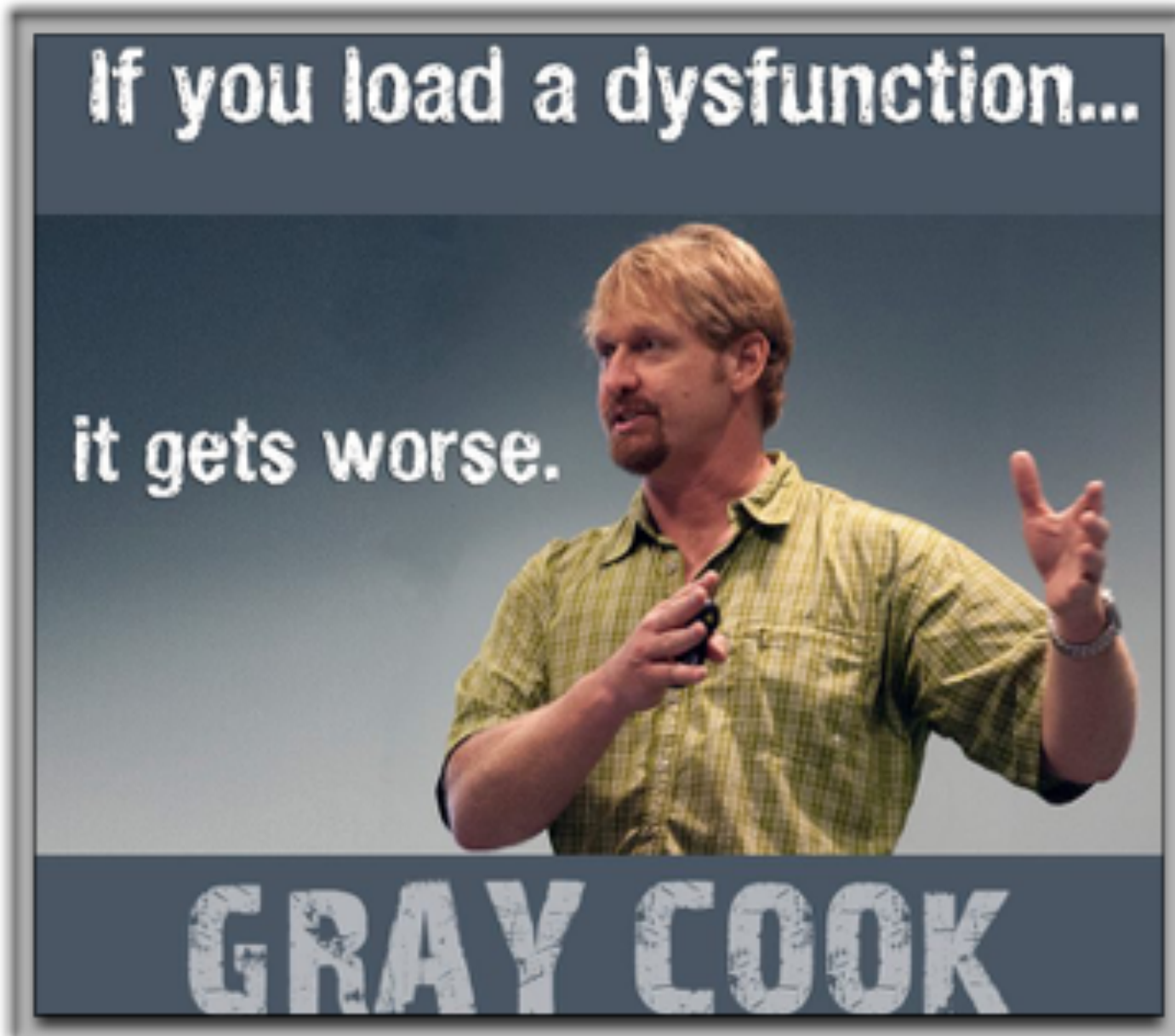




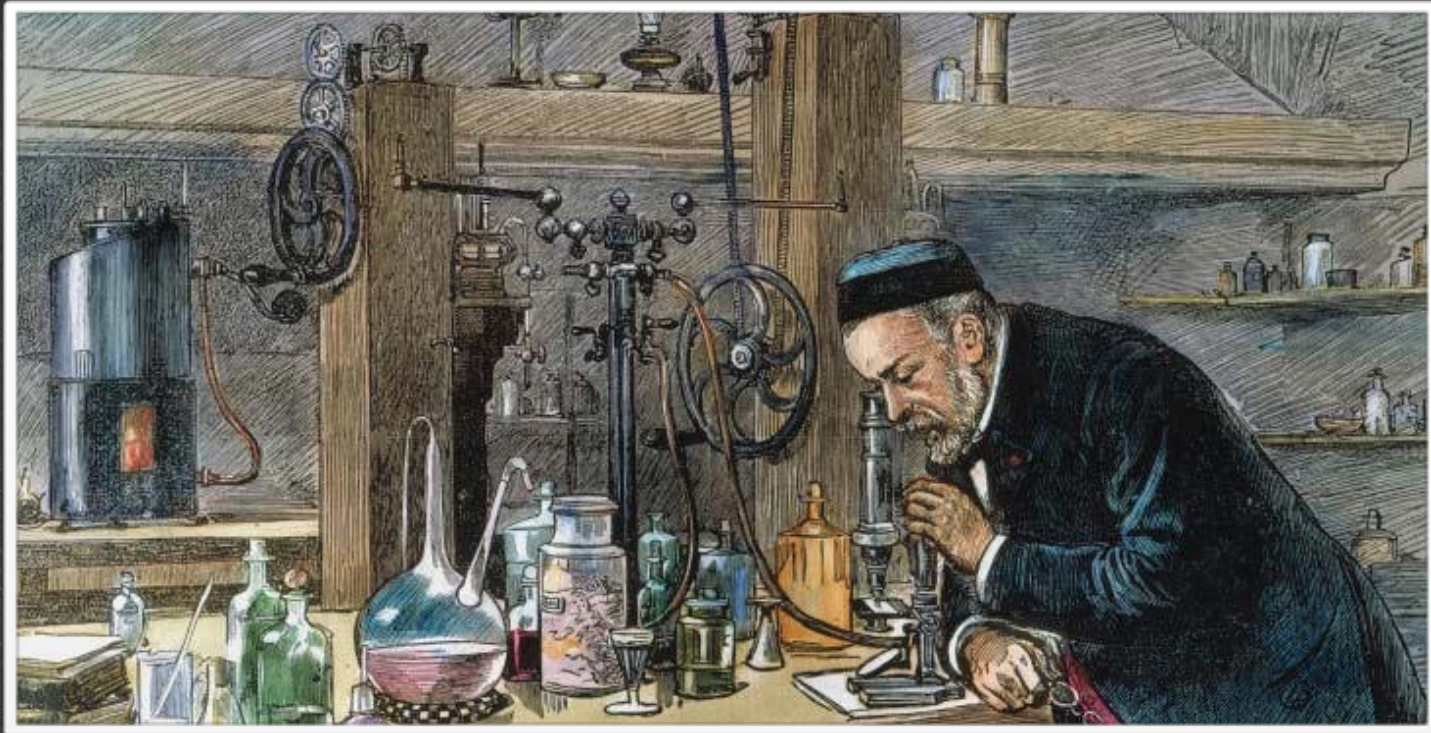
Your body is a very limited resource. If you're going to abuse it, make some deposits.
Brian Carroll

TRADITIONAL TRAINING TRAP
IS MORE BETTER?

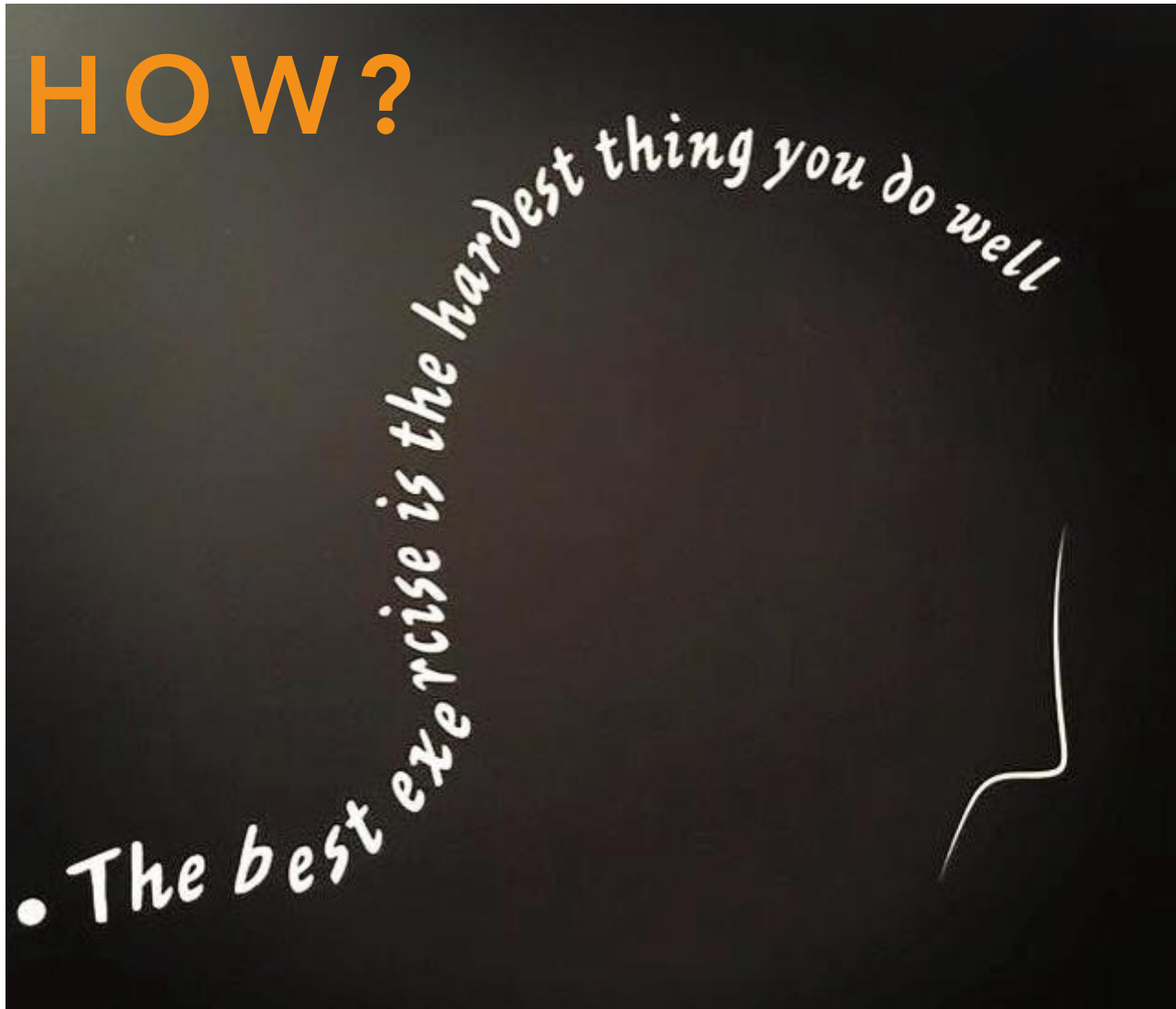
SUSTAINABLE ATHLETICISM



LOUIS PASTEUR



“In the field of observation, chance favours only the prepared mind”



BW SQUAT



OH SQUAT



FRONT SQUAT



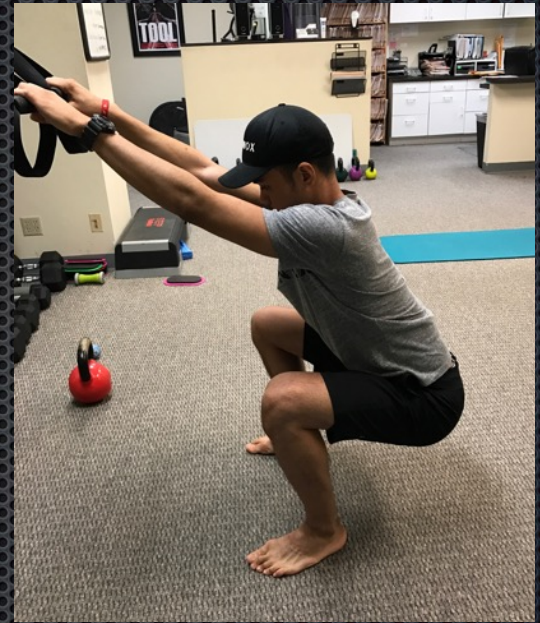
BACK SQUAT



GOBLET SQUAT



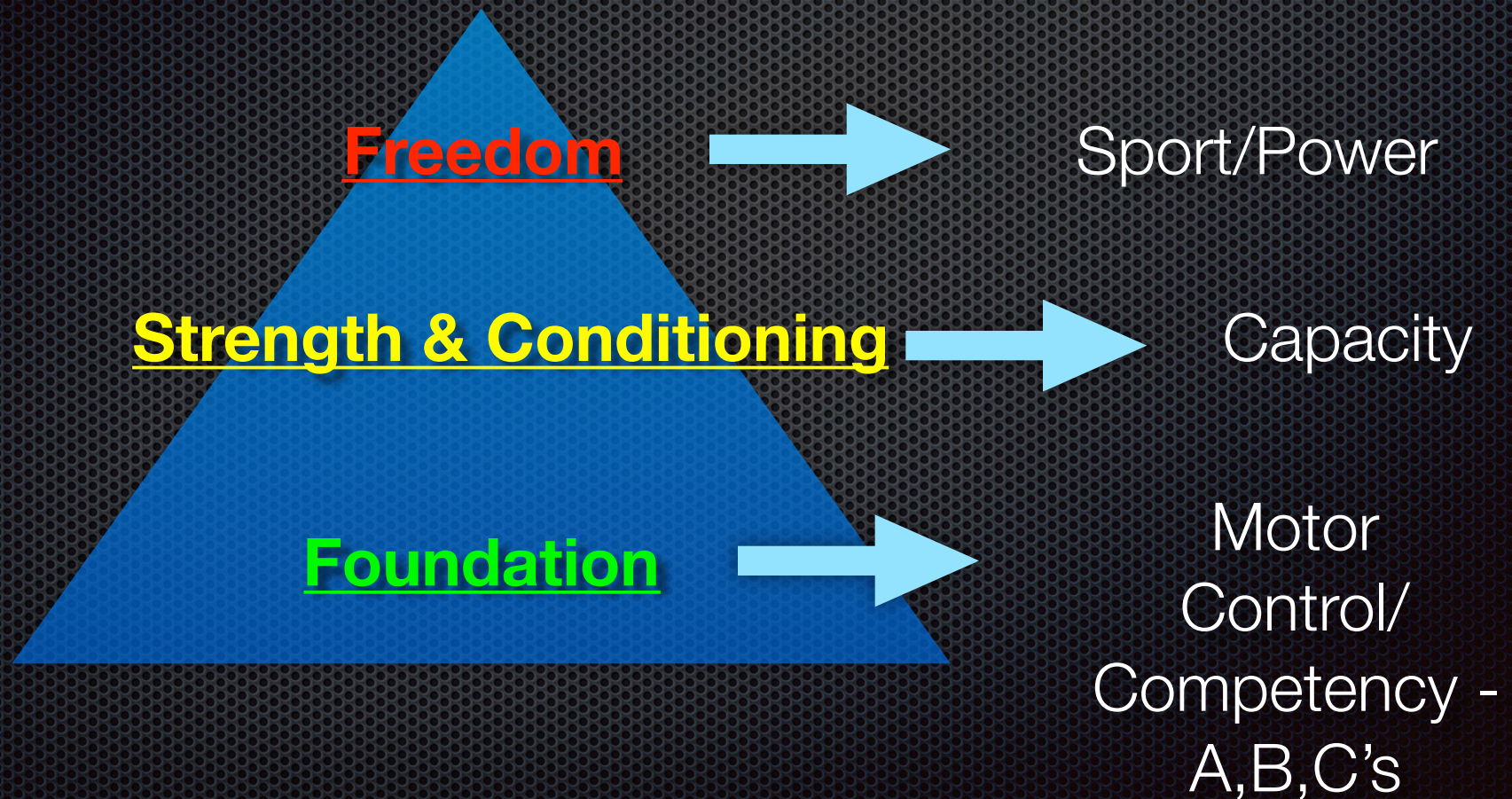
TRX SQUAT



SUMO SQUAT



Training Pyramid



Pain vs. Dysfunction

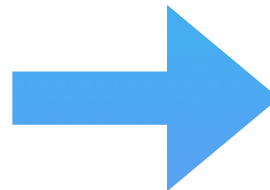
“pain & dysfunction, regardless of their origin, alter motor control. That is why initially we focus on **training the most dysfunctional, non-painful pattern.**”



YOUR COMFORT ZONE IS A CAGE **SUSTAINABLE ATHLETICISM**



Overload or Novelty



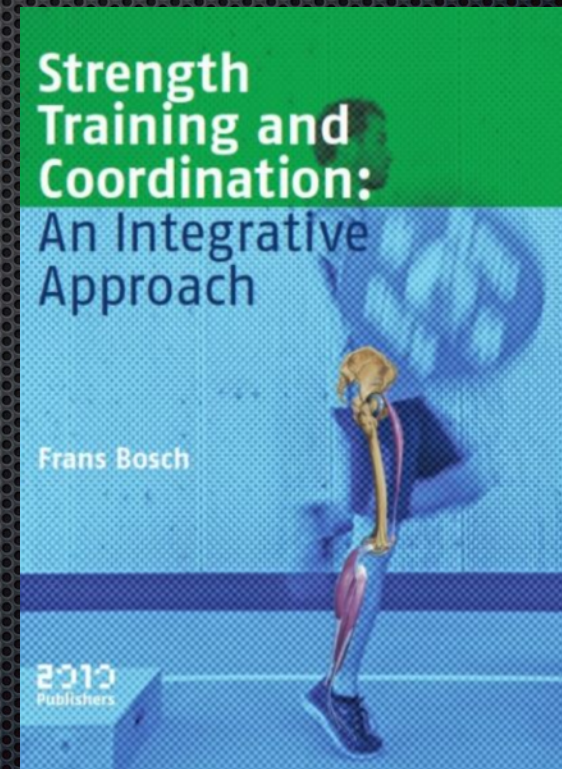
Adaptation



Over-Correcting



- ✦ “Precise movement correction by strength coaches & PTs, for instance during trunk control exercises, are thus not so much a sign of professional expertise as a sign of ignorance about how movements are controlled. Well-intentioned but misapplied expertise can often be highly damaging.” Wulf, 2008



V) What is the Function of the Trunk in Movement?

- ✦ "Athletic performance depends on being able to **generate power through your arms and legs**. That power is only possible if your **torso and hips provide a solid, stable platform**.'" - Stuart McGill



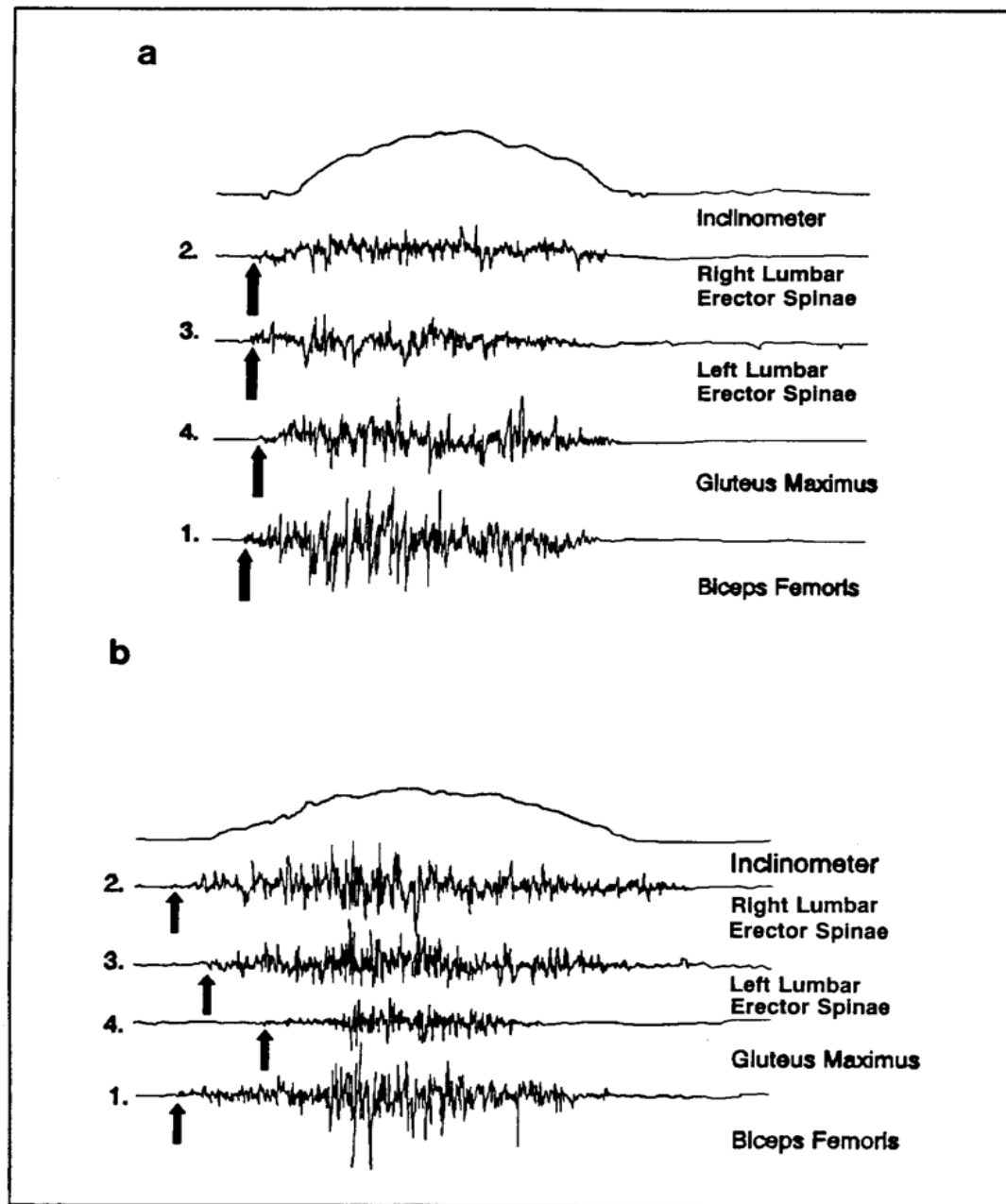
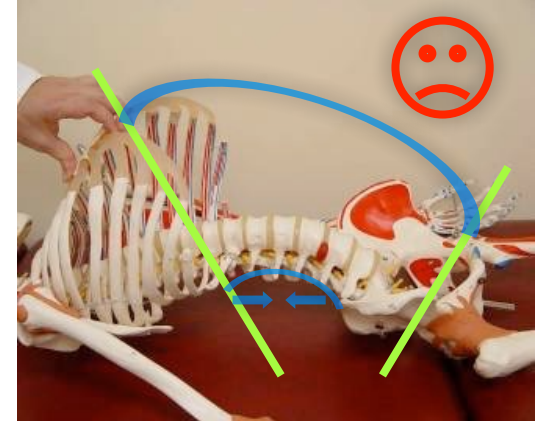
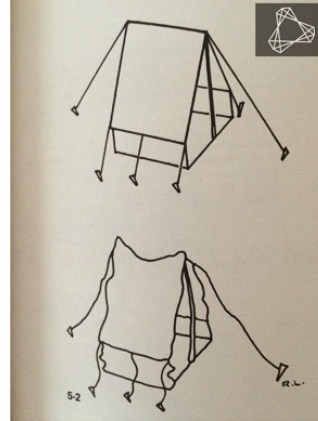


Figure 3. Graphic illustration of an electromyographic recording of a typical recruitment pattern of (a) a control group subject and (b) an injured group subject. (Arrows indicate onset of activation; numbers indicate the sequence of activation.)

Pr Janda



SUSTAINABLE ATHLETICISM



**Its a stability
problem until
proven
otherwise**

Craig Liebenson, DC

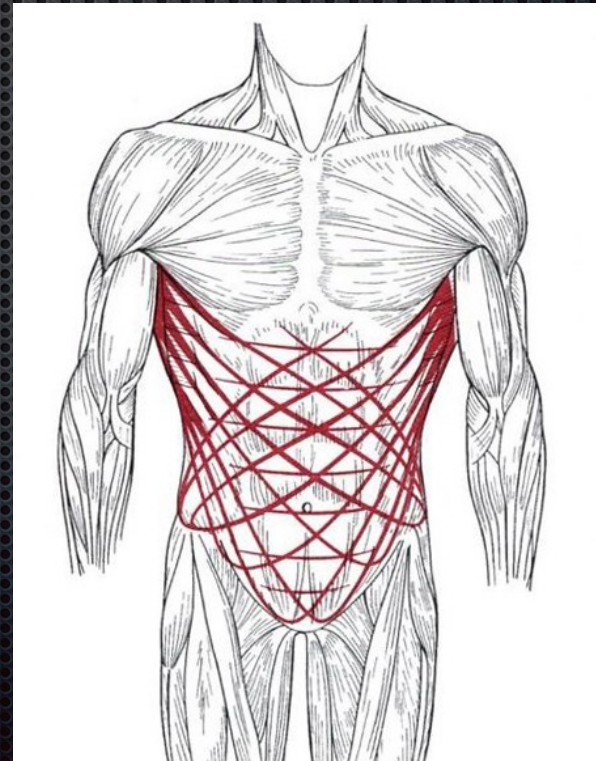
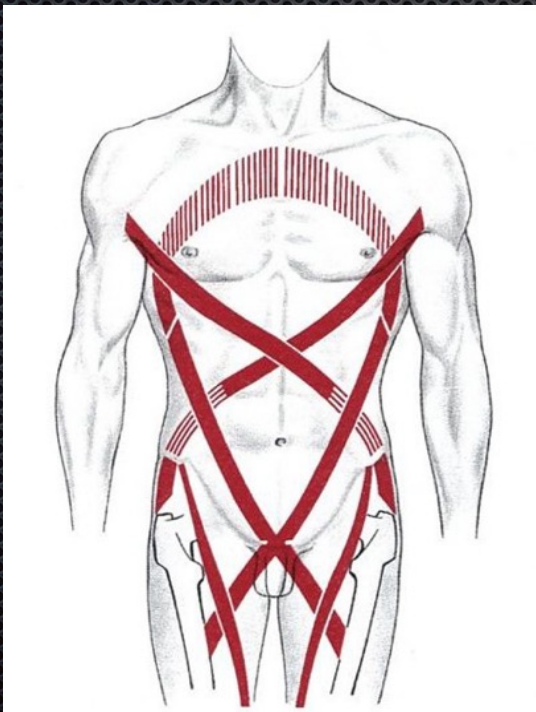
#LASPORTSANDSPINE





PNF

Core (proximal) Stability for Distal Mobility



SUSTAINABLE ATHLETICISM



SUSTAINABLE ATHLETICISM



SUSTAINABLE ATHLETICISM



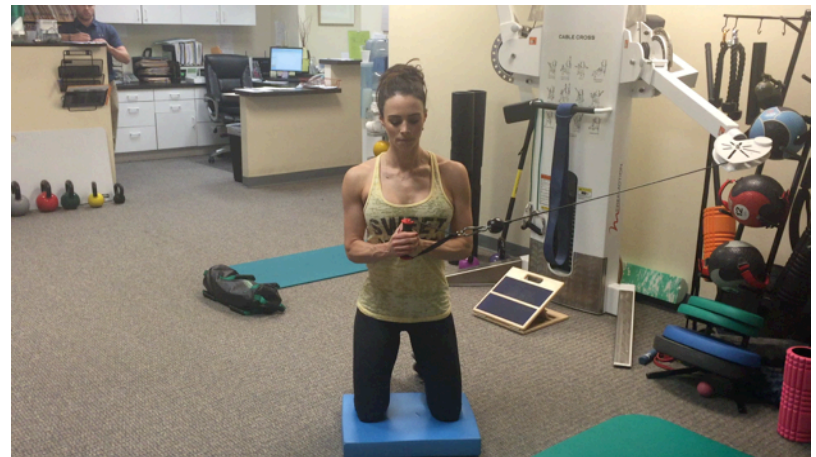
SUSTAINABLE ATHLETICISM



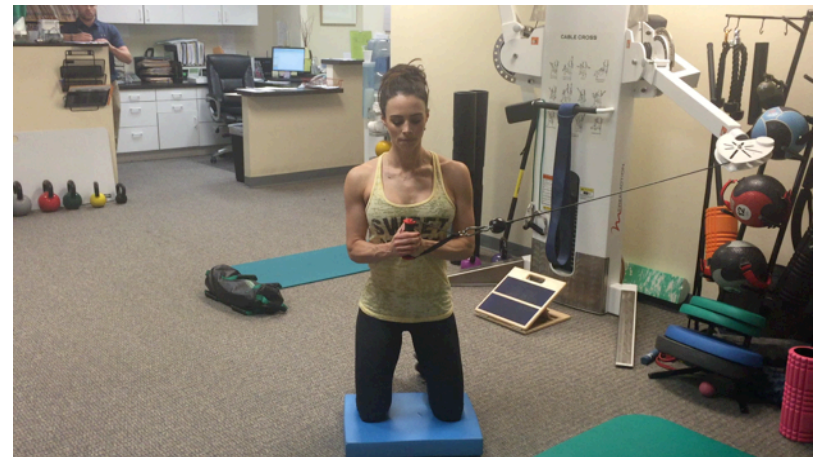
SUSTAINABLE ATHLETICISM



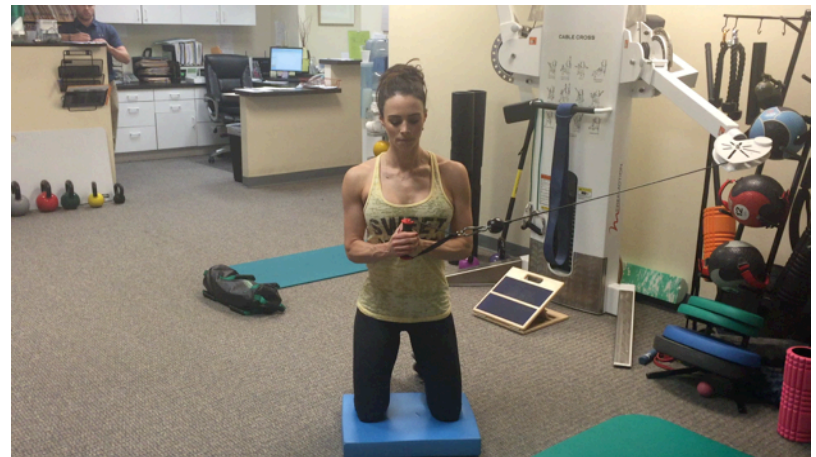
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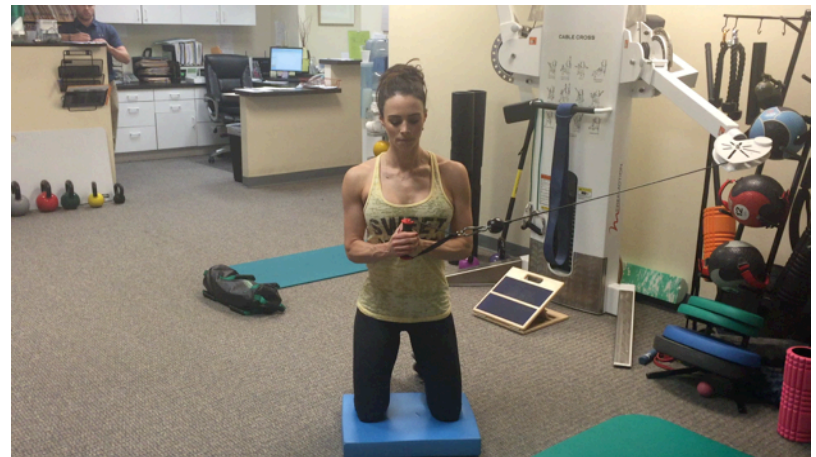
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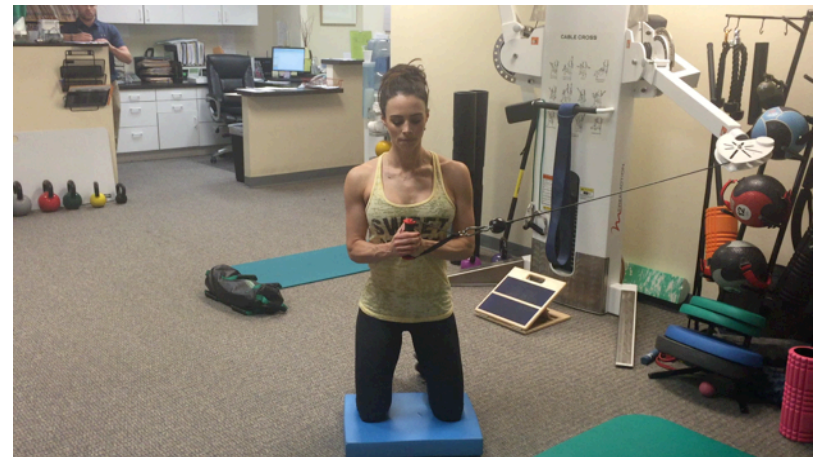
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Proper positioning with “hips locked in”



Improper position with “hips breaking”



1 THE FOLD

Prop the pizza on the upturned fingertips of both hands, at chin height, perpendicular to the body. Gently squeeze the outer edges of the crust until they meet in the middle. Crease the slice longways and direct the sharp end toward the mouth.



2 THE BEND

As the pizza approaches, lean forward at an angle of approximately 35 degrees, enabling the mozzarella grease to drip harmlessly onto the ground, thereby avoiding irremovable stains on the shirt or pants. Insert slice into mouth.

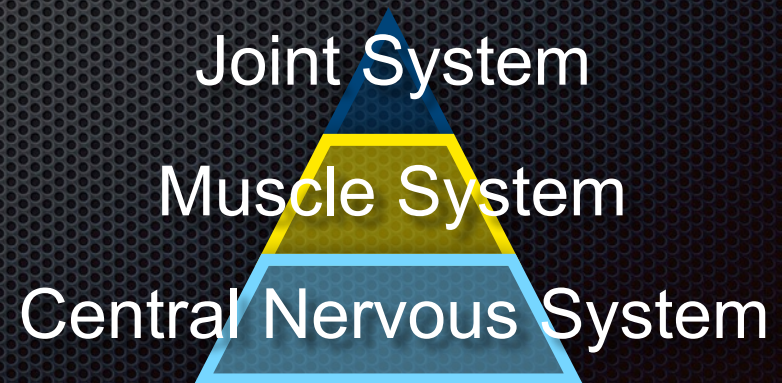
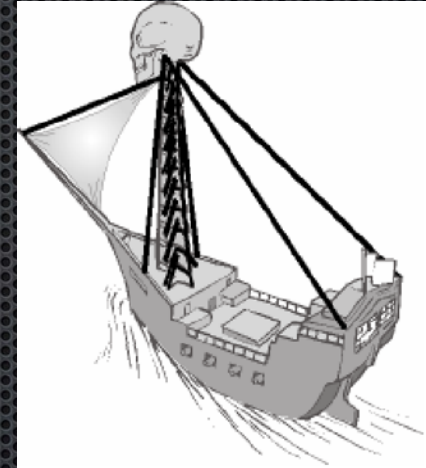


Stabilization Principles

Movement vs Moment

“evidence from tissue-specific injury generally supports the notion of a neutral spine (neutral lordosis) when performing loading tasks to minimize the risk of low back injury.”

*McGill SM. In Resource manual for **Guidelines for Exercise Testing and Prescription**. 3rd Edition, Williams and Wilkins, 1998.*



Multi (Tri)-Planar Function



✦ Sagittal



Frontal



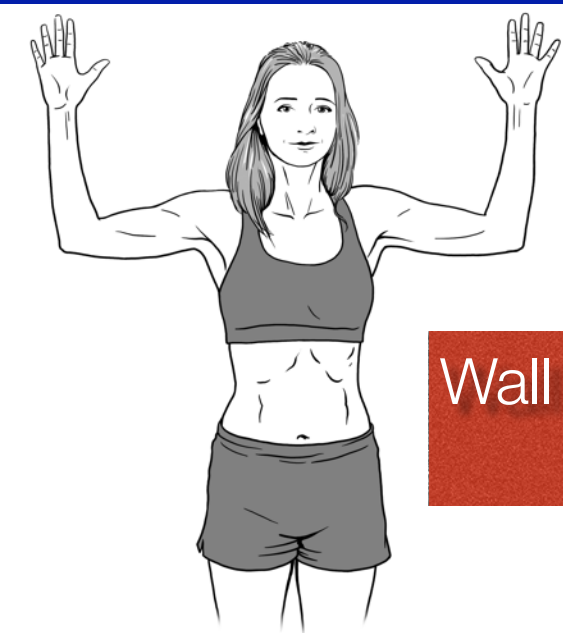
Transverse

- ✦ Training should be **multi-planar**. Athletes stop/start, change directions, twist, etc. Therefore **sagittal, frontal & transverse planes** should all be assessed & trained.

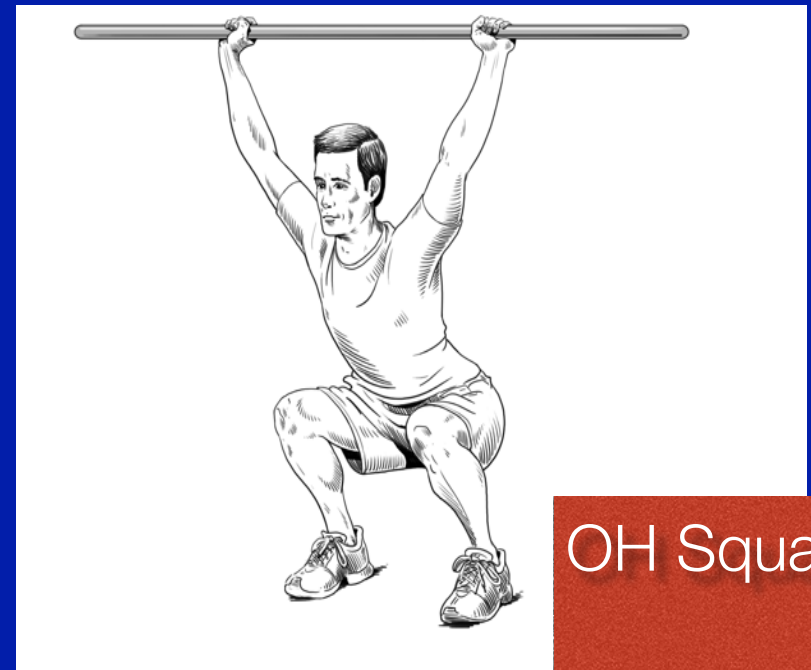




a. Sagittal Plane ANTI-FLEXION

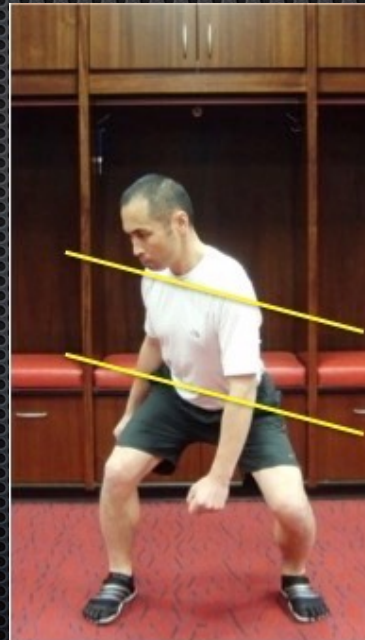


Wall Angel

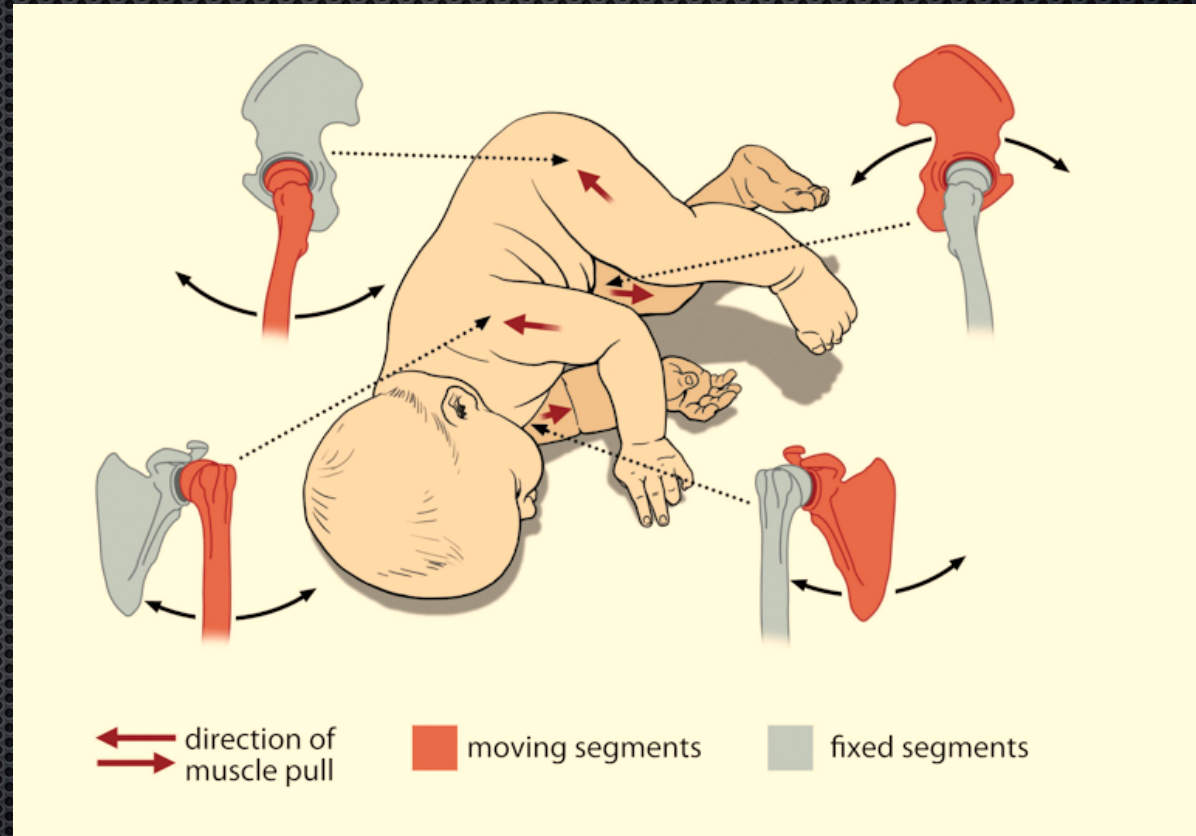


OH Squat

b. Frontal Plane **ANTI-SIDE BENDING**

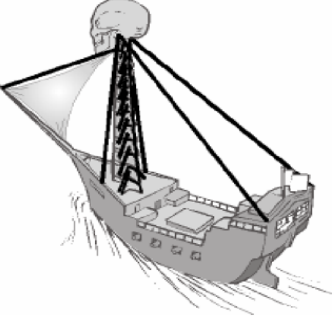


c. Transverse Plane **ANTI-ROTATION**

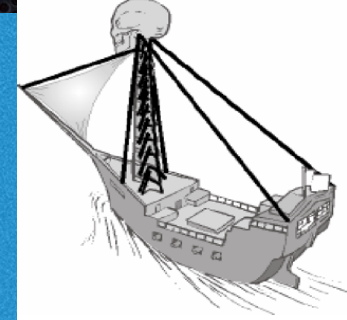


TRAINABLE MENU - CORE

1. FRONT PLANK
2. SIDE PLANK
3. PLANK ROLL
4. STABILITY BUTTRESS
5. PLANK TO PUSH-UP
6. STIR THE POT
7. SAND BAG DRAG
8. WALK OUT
9. SLIDE OUT FROM HIPS



5 Stabilization Principles

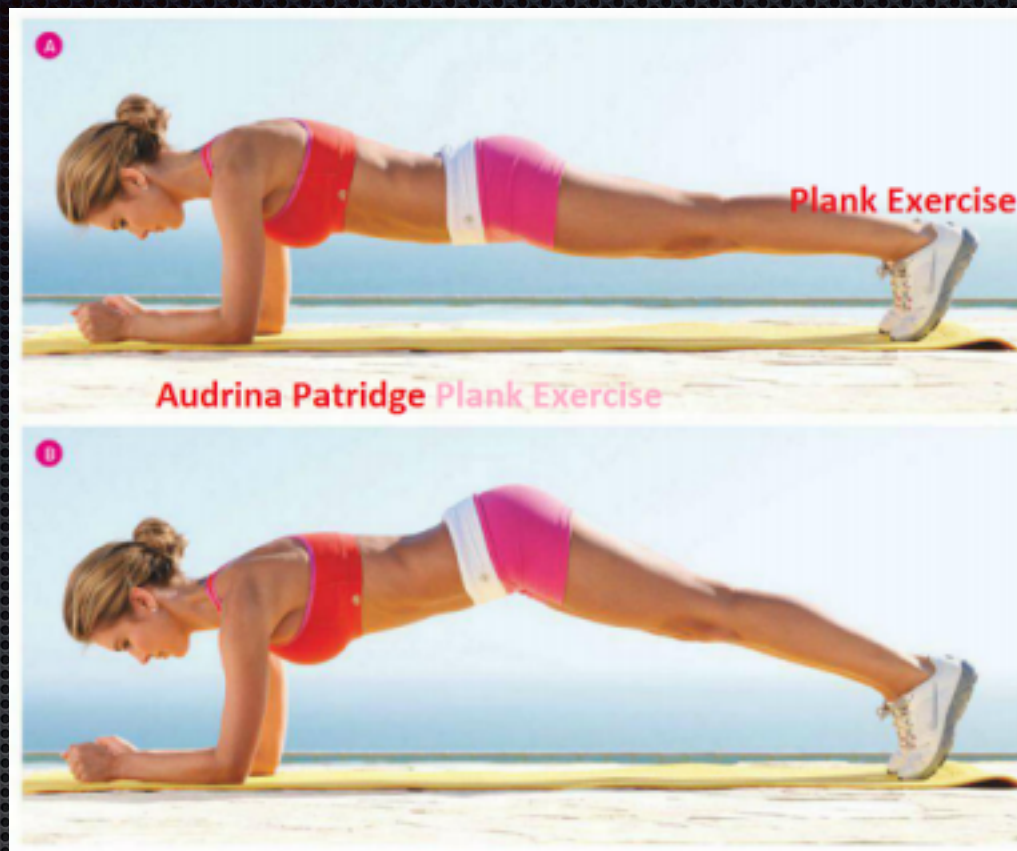


1. Training should be functional - i.e. work in all planes of motion
2. The spine should be in normal upright posture - i.e. slight arch
3. Breathing should be relaxed
4. Exercises should be challenging
5. Slight discomfort is acceptable, but the goal is to feel your abs much more than your back

1. FRONT PLANK



Max 8 second hold
Max 6 reps



2. Side Plank

- Can you hold for 60s
- What is your max on each side
- R /60s
- L /60s



- ✿ Max 8 second hold
- ✿ Max 6 reps

3. Plank Roll

Pause in each position

Max 6 reps on each side

- ❖ How many can you do?
/6
- ❖ Which side limits you?

4. Torsional Buttress



- ❖ 1-3 second hold & switch arms
- ❖ Max 6 reps
- ❖ How many can you do? /6
- ❖ Which side limits you?
- ❖ Does a foot lift up?

5. Plank to Push-up

- ❖ Pause in each position
- ❖ Max 10 reps
- ❖ How many can you do? /10



6. Plank with Sandbag or KB Pull



- * Minimum 2s drag
- * Max 6 reps
- * How many can you do? /6

7. Stir the Pot

1. Rest on ball



2. Set feet & lock knees



3. Press up

4. Roll ball out & back
5. Stir the Pot

8. Plank Walk-Out



- ✦ Max 30 second
- ✦ Out & back
- ✦ How long can you go? /30s

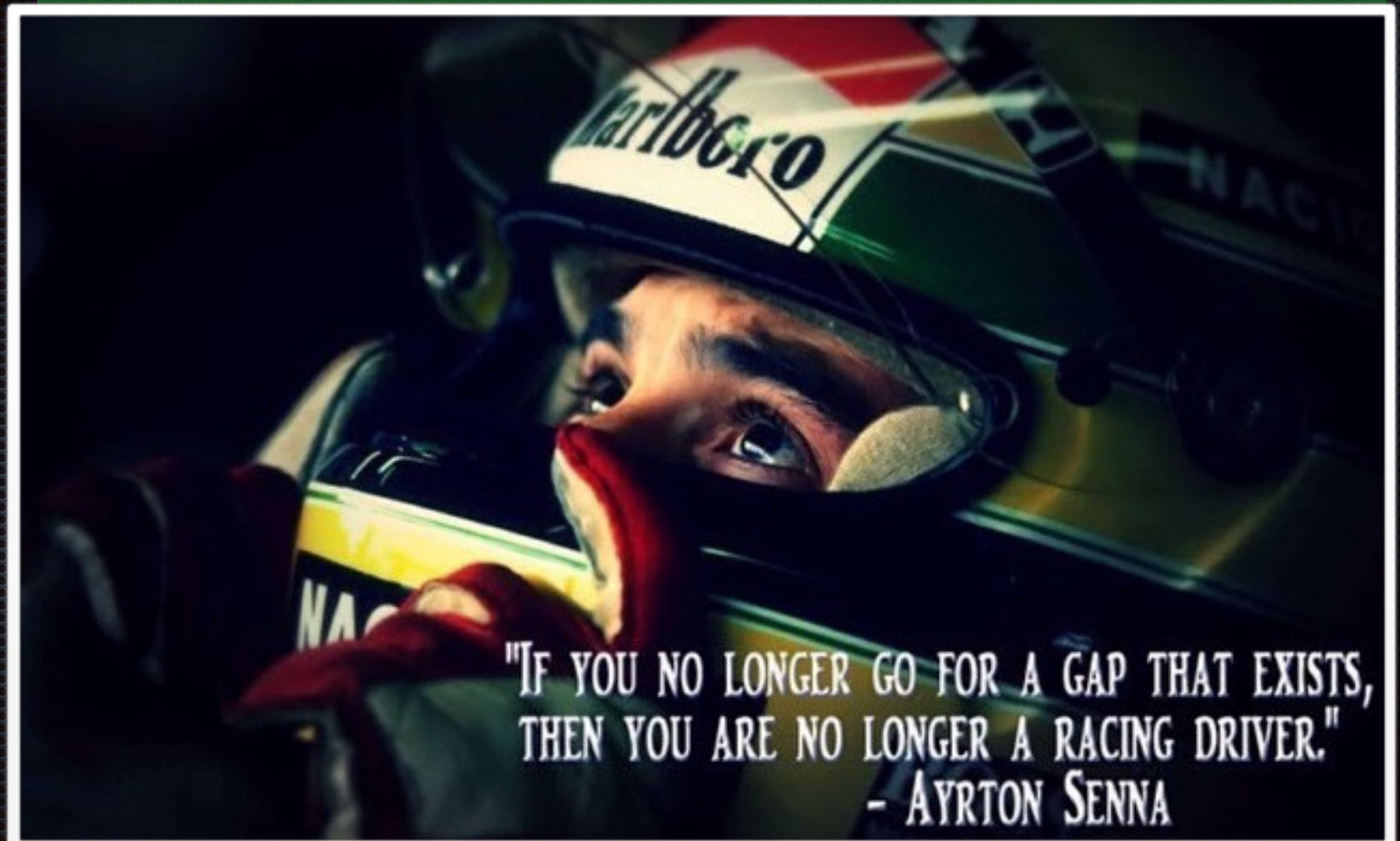
9. Slide Out from Hips

- ✿ Max 30 second
- ✿ Out & back

"this study gives some foundation to the practice of including isometric core exercises into athletes' training regimens & **pregame warm-up**....isometric core exercise programs are part of a successful **injury prevention programs.**"



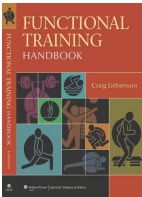
VI) Process is King



“The thing that surprised us is that most of the principles used on most elite athletes are applicable to everyone—that crosses age, gender, sport.”

Dr. Michael Stuart - the Mayo Clinic

EXOS™



COOK AND DOCKING 2015

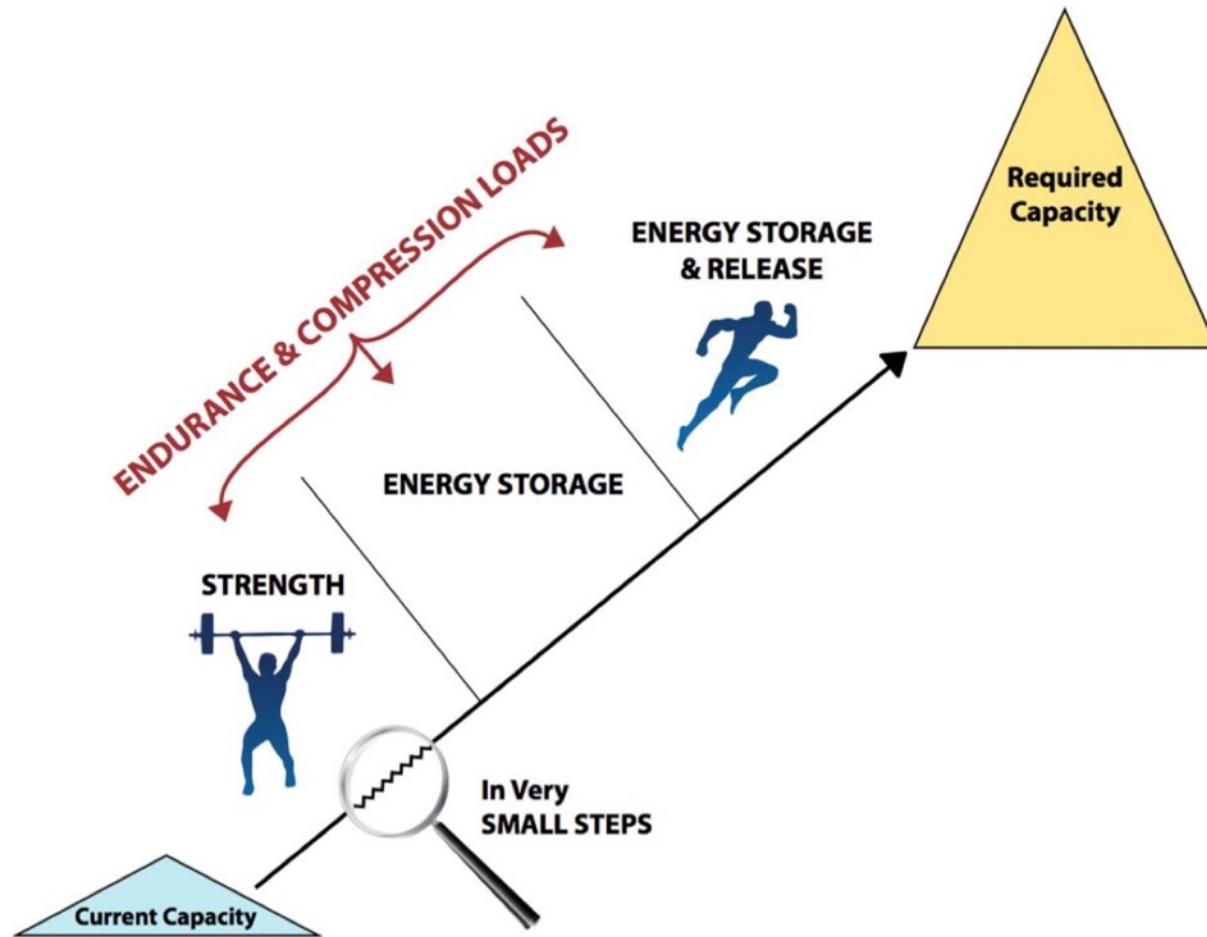


Figure 1 Schematic of tendon rehabilitation, improving tendon capacity with progressive loads. Introduction and progression of endurance and compressive loads are critical within each stage. The start and end points of rehabilitation will vary between individuals.

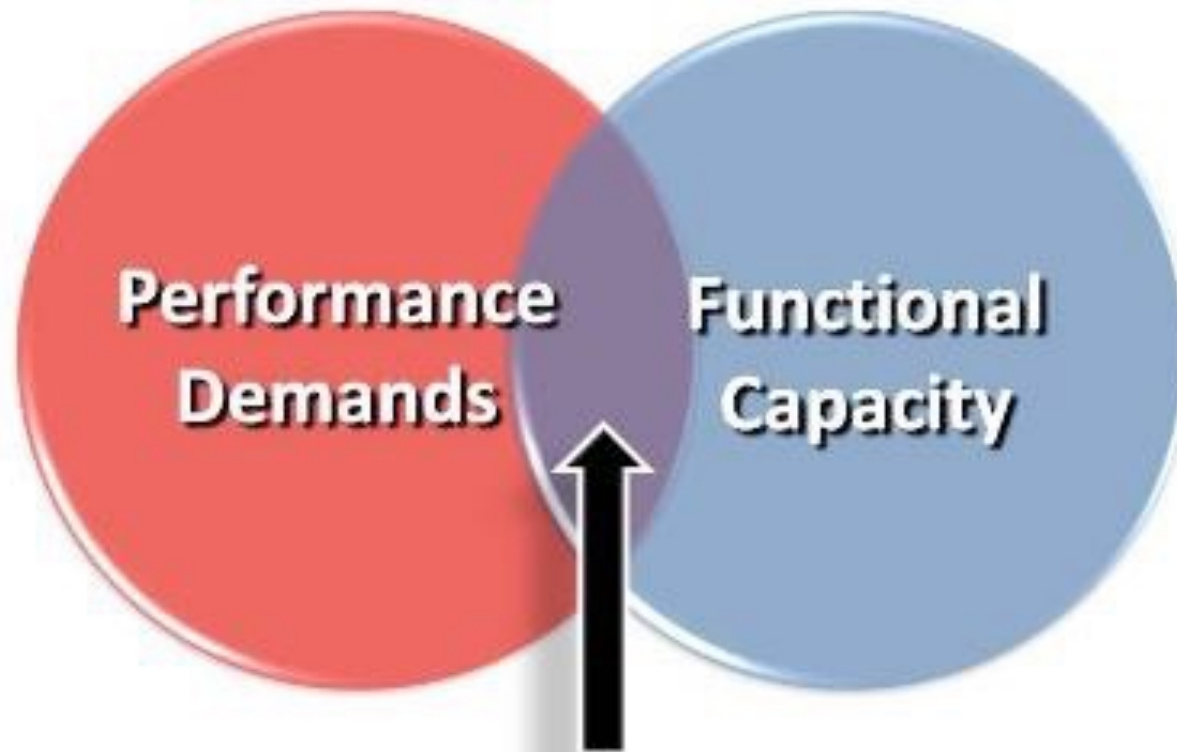
**Profile your
athlete then build
your program. The
program comes
after.**

Henk Kraaijenhof

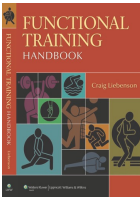
#LASPORTS&SPINE

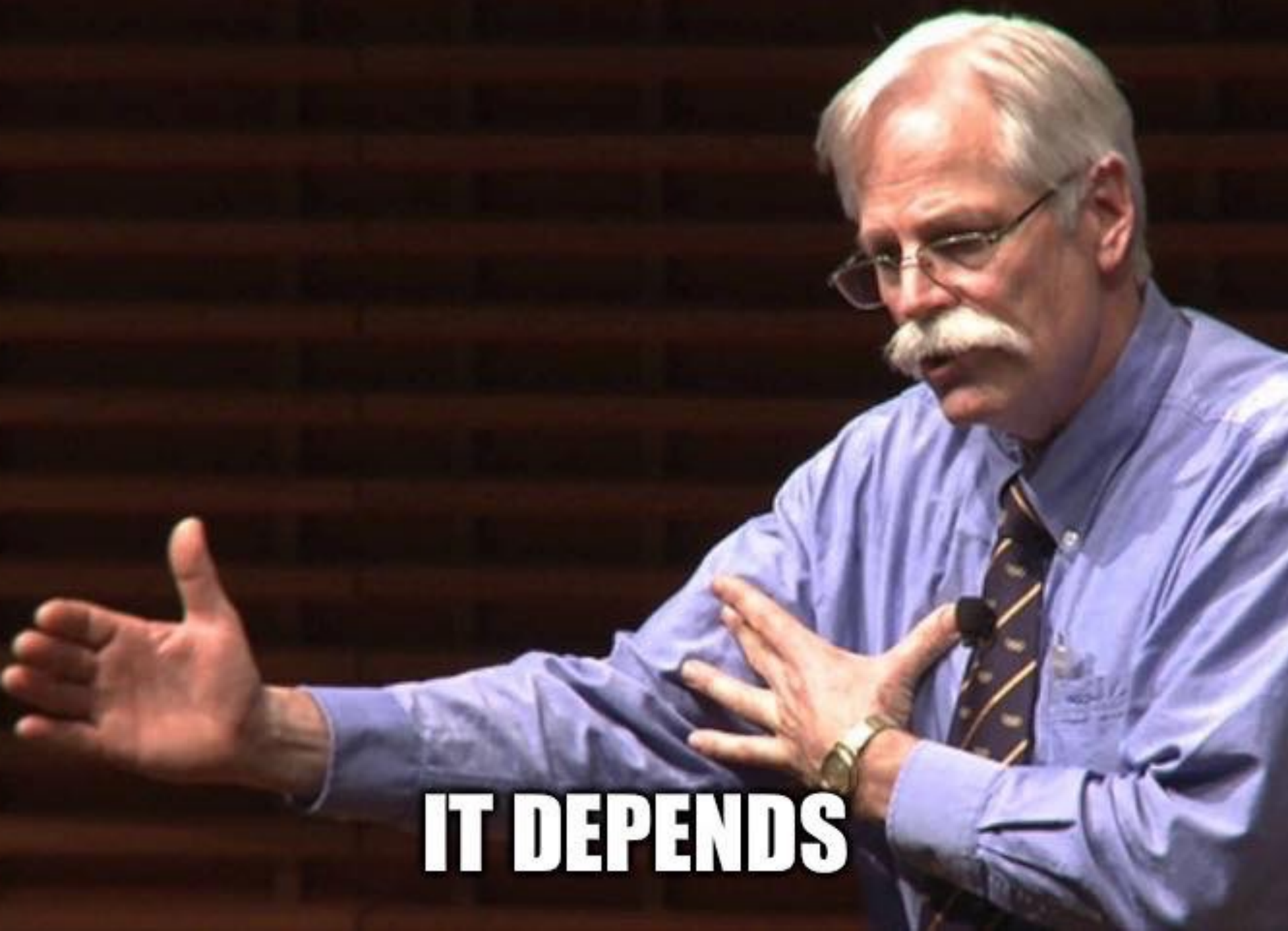


“Time spent in assessment
saves time in management”



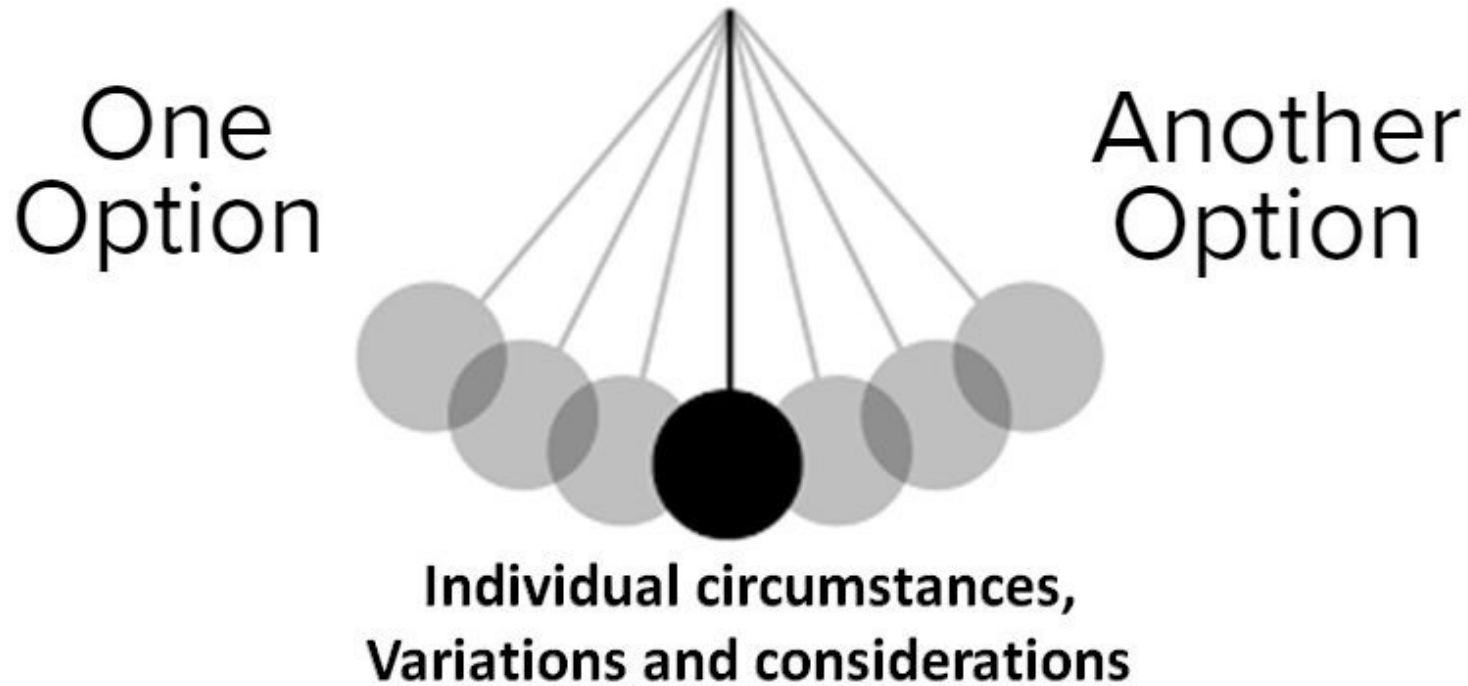
Optimizing Functional Performance





IT DEPENDS

Consider Context

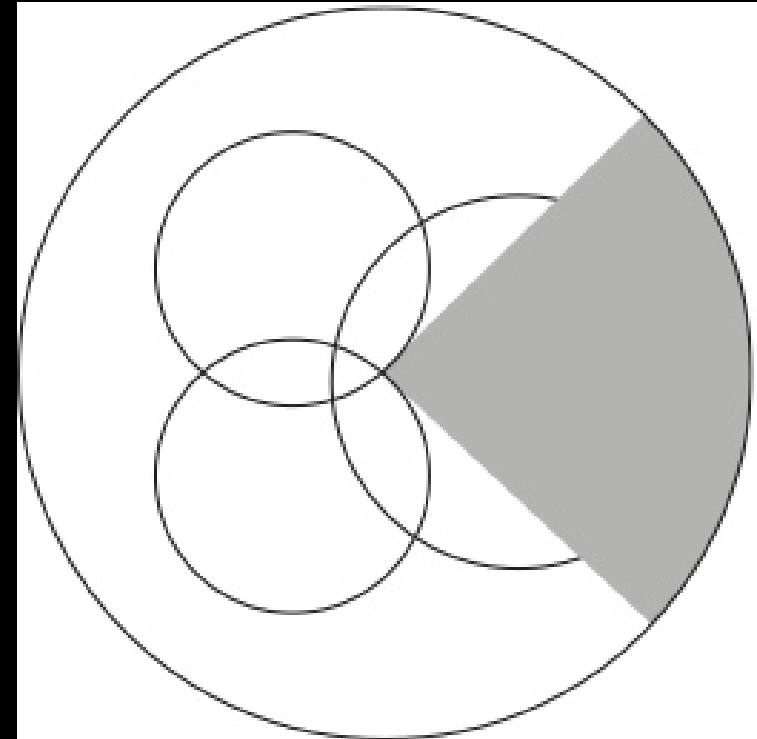
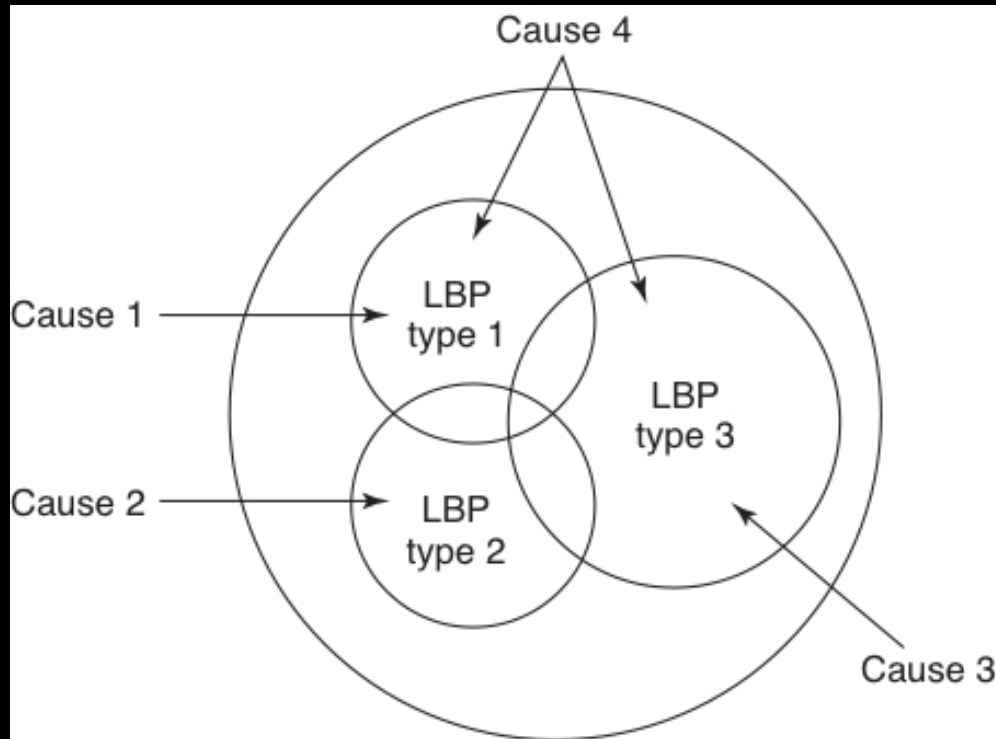


Because it always depends

$$N = 1$$



ONE SIZE FITS ALL STRATEGY?



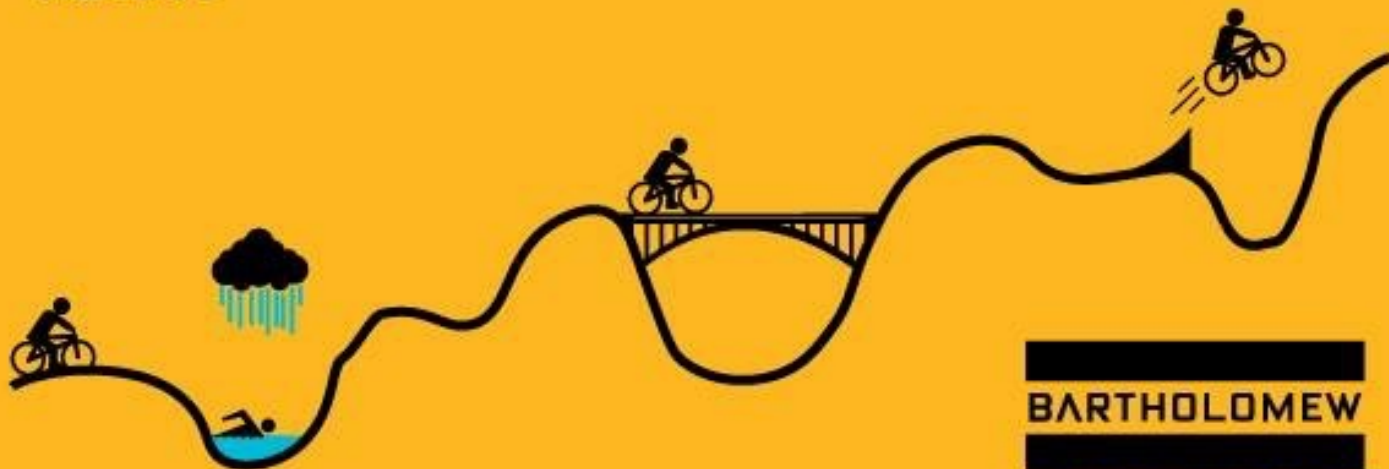
- Suboptimal due to heterogenous patient population

CHASING SUCCESS

FANTASY



REALITY

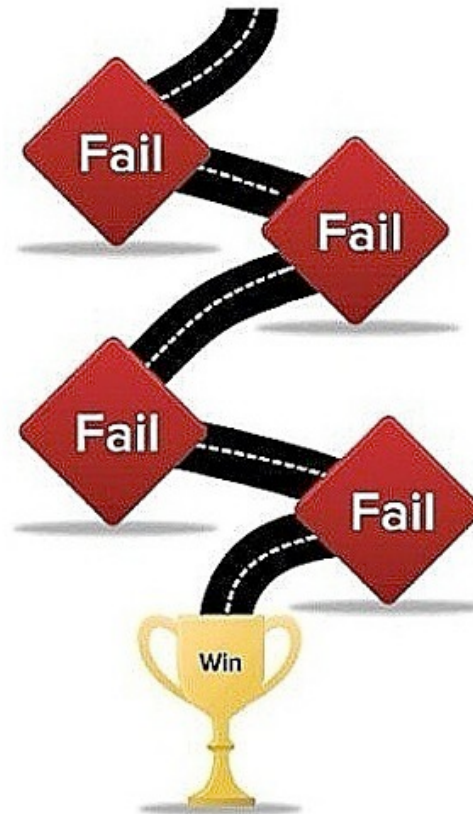


BARTHOLOMEW
STRENGTH

What Most People Think



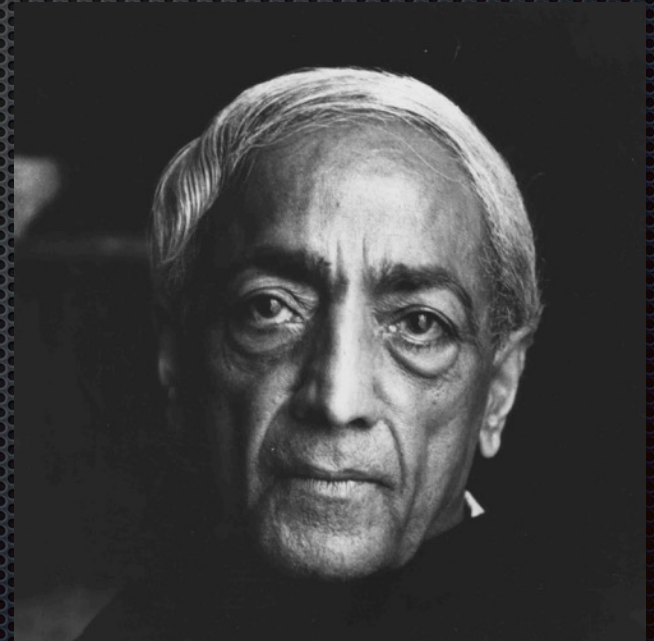
What Successful People Know



Progress

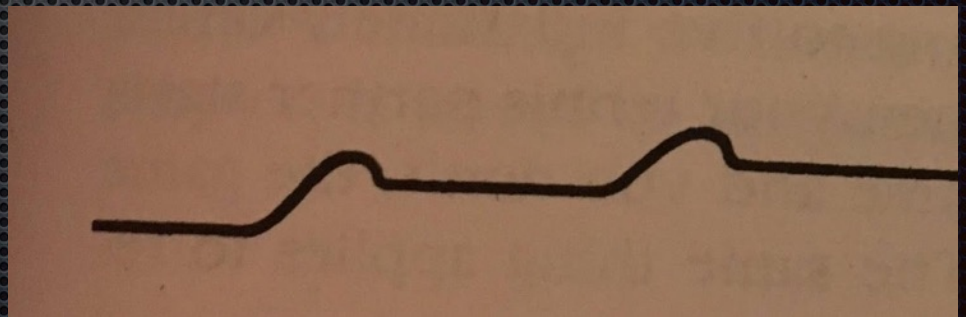
- ✧ “Just because the window is open there is no guarantee the breeze will blow in. However, if the window remains shut - there is no possibility the breeze will enter.”

✧ Krishnamurti



Progress

- ✧ “The trick is not in generating progress initially - but rather how to revive progress once the initial bust subsides.”
- ✧ Marty Gallagher



Keep it simple

- Then, follow the PROCESS
 1. HISTORY - What is the goal?
 2. EXAM - Find the weakest link & the painful triggers
 3. TRAINABLE MENU - “hardest thing you do well”
 4. RE-ASSESS for results

“I understand the quick fix mindset ...But I think in everyday life, I don’t know anything that happens quick too often. I’ve really come in close contact with that idea where little improvements here and there, they don’t come easy, but they do come if you keep at it. And I think it’s not realistic for us to really think that a pill or something is just going to take care of it.”

**-Gabby Reece
Former Professional Beach Volleyball Player**

Move Forward.

www.MoveForwardPT.com





"People want to fix it all in one day. We have to take long game view. What is it going to look like in 10 or 20 years?"

Kelly Starrett

#LASPORTSANDSPINE

**Judge yourself
not by your
clients success
with you but by
their subsequent
workouts without
you.**

Nick Winkelman

#LASPORTS&SPINE



Sustainability



TRAIN SO WHEN YOU'RE DONE PLAYING YOU
CAN DO WHATEVER YOU WANT TO DO
ACCEPT & FIND YOUR WEAKNESSES
(KRYPTONITE) & WORK ON THEM

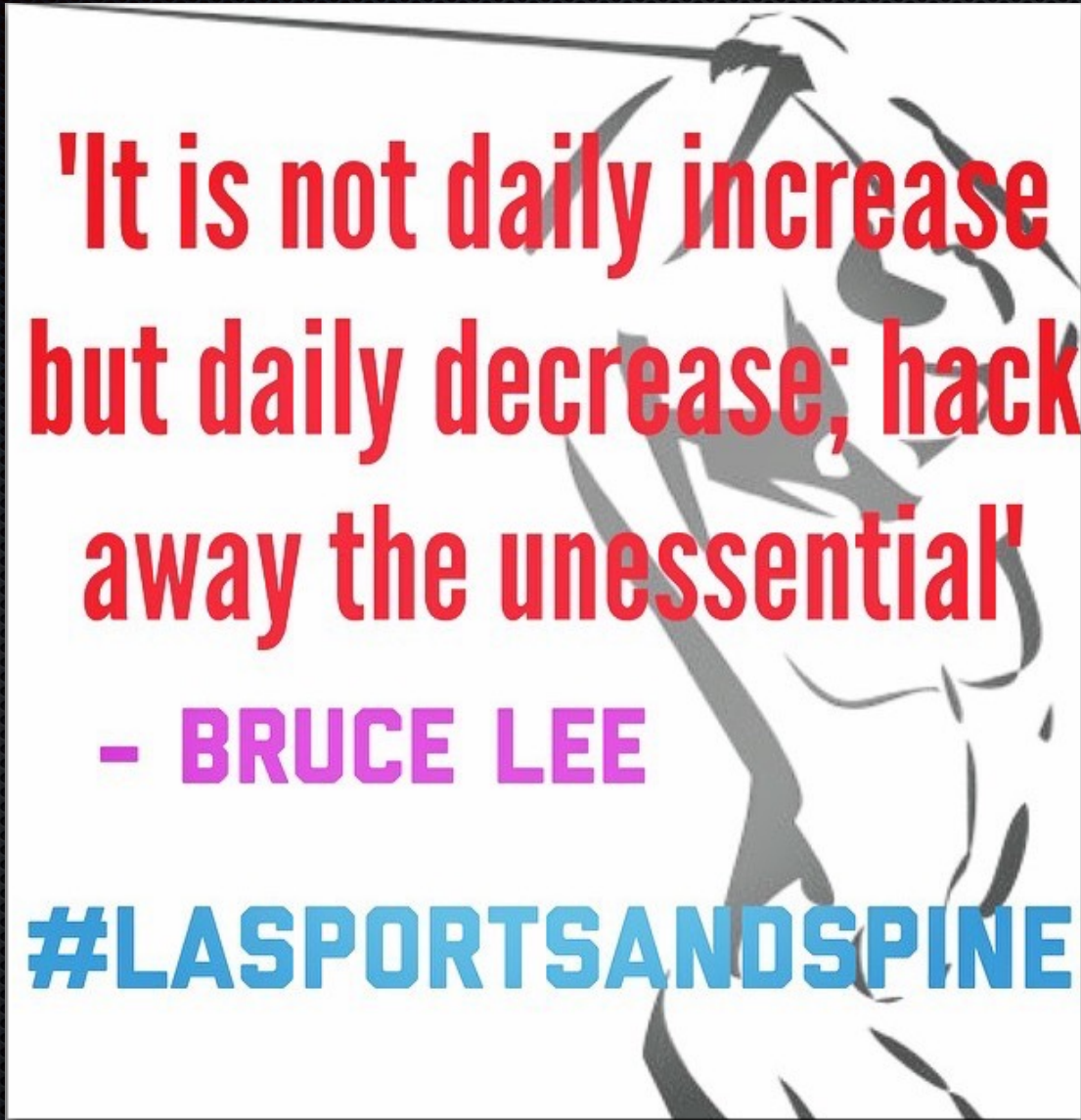


60 is the new 40

Summary

Transformation

- ✧ **The Irreducible Core Essence**
- ✧ “Could an already sparse methodology be pruned & pared, trimmed & reduced, w/out losing the essential essence?”
- ✧ Marty Gallagher



**'It is not daily increase
but daily decrease; hack
away the unessential'**

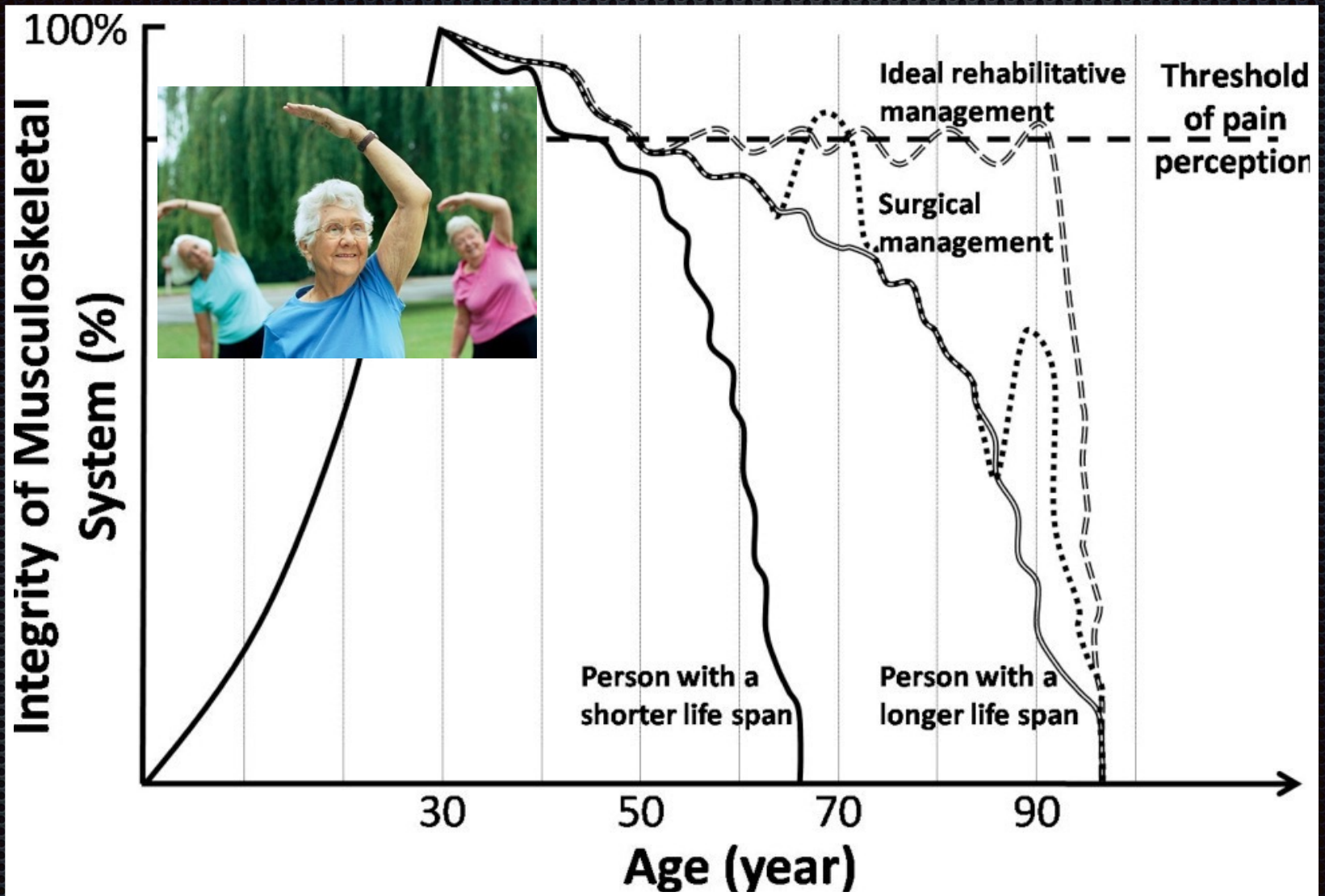
- BRUCE LEE

#LASPORTSANDSPINE

**“What enhances performance
prevents injury”**



Sustainability

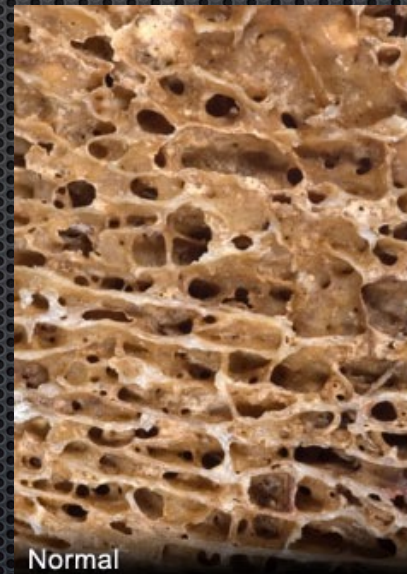


Chung SG. What Is on the Horizon? Adding a New Item to Our List: Mechanical Connective Soft Tissue. PM&R

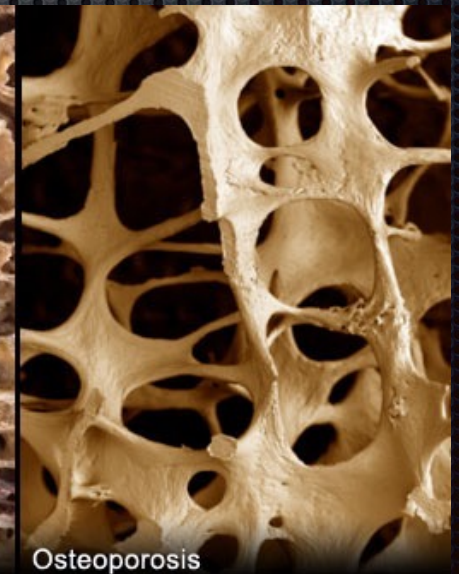
2012;4:247-251(1012)(DOI:10.1016/j.pmrj.2012.03.001)

Use it or Lose it

“No Strain No Gain”



Normal



Osteoporosis

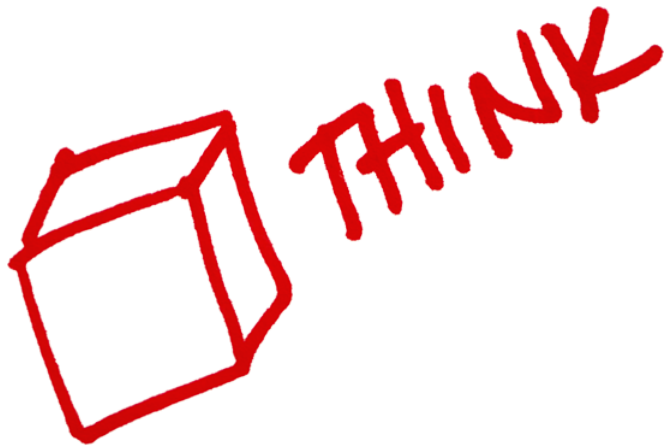
4 PRINCIPLES of The Functional Approach

1. **QUALITY > QUANTITY** - JANDA 101
- “every exercise is a test”
2. **NO PAIN** - not “boot camp” - <3/10
3. **“THE HARDEST THING YOU DO WELL”** - Modern Load Management
- Competent Capacity
4. **INTEGRATED APPROACH** -
“SILENT KILLER” - painless dysfunction

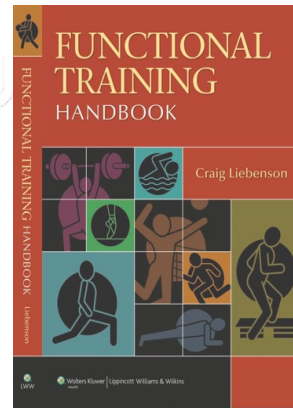


“I take better care of myself today not as an accommodation to age but to maintain continual high levels of performance and just to feel good.”

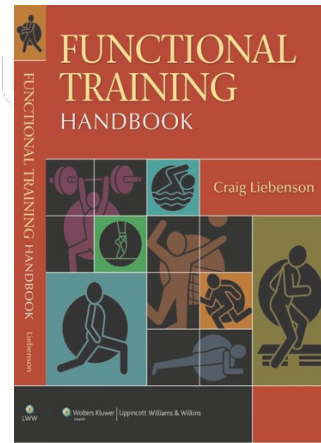
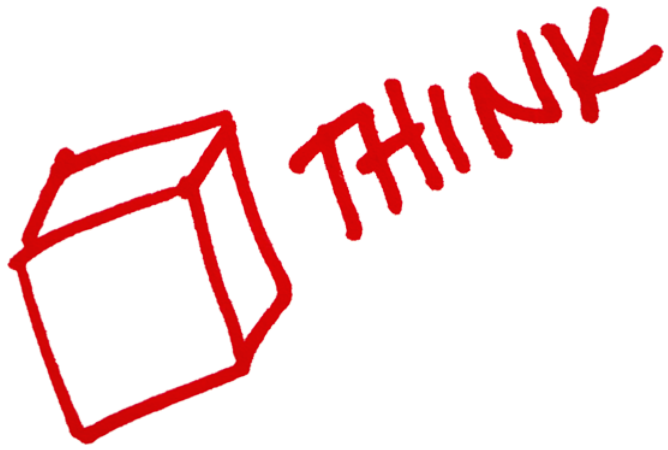
Laird Hamilton



EQU



- Feats of Strength vs Trainable Exercises
- Athletic Sustainability
- “The Hardest Thing You Do Well”



- “First move well then move often”
- The client/athlete/patient’s goal is the goal
- Programming for the long view

“I am the only one of the old boys who likes to steal from everyone. I am open to everyone.” - K. Lewit



GOOD THEFT	VS.	BAD THEFT
HONOR		DEGRADE
STUDY		SKIM
STEAL FROM MANY		STEAL FROM ONE
CREDIT		PLAGIARIZE
TRANSFORM		IMITATE
REMIX		RIP OFF



Chiropractic &
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College of
Australasia

