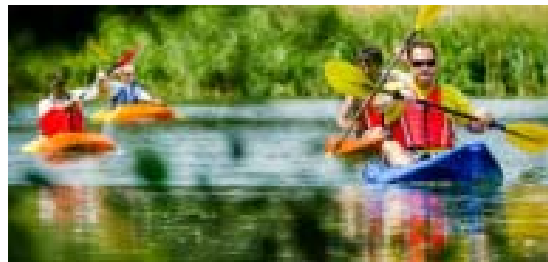


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# Performance Health



## Basic Building Blocks for Success

British Canoeing Racing Seminar 2018

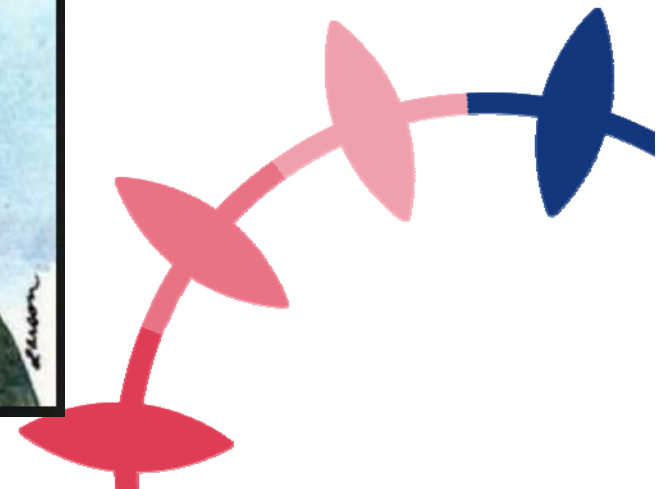
Jude Spiers - Physiotherapist



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## Common Language



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## **Definition: Health**

World Health Organisation:

- "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

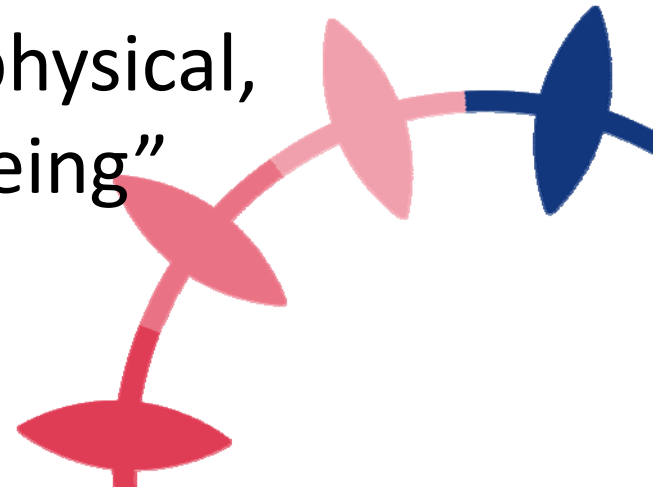


**World Health  
Organization**



# Definition: Performance Health

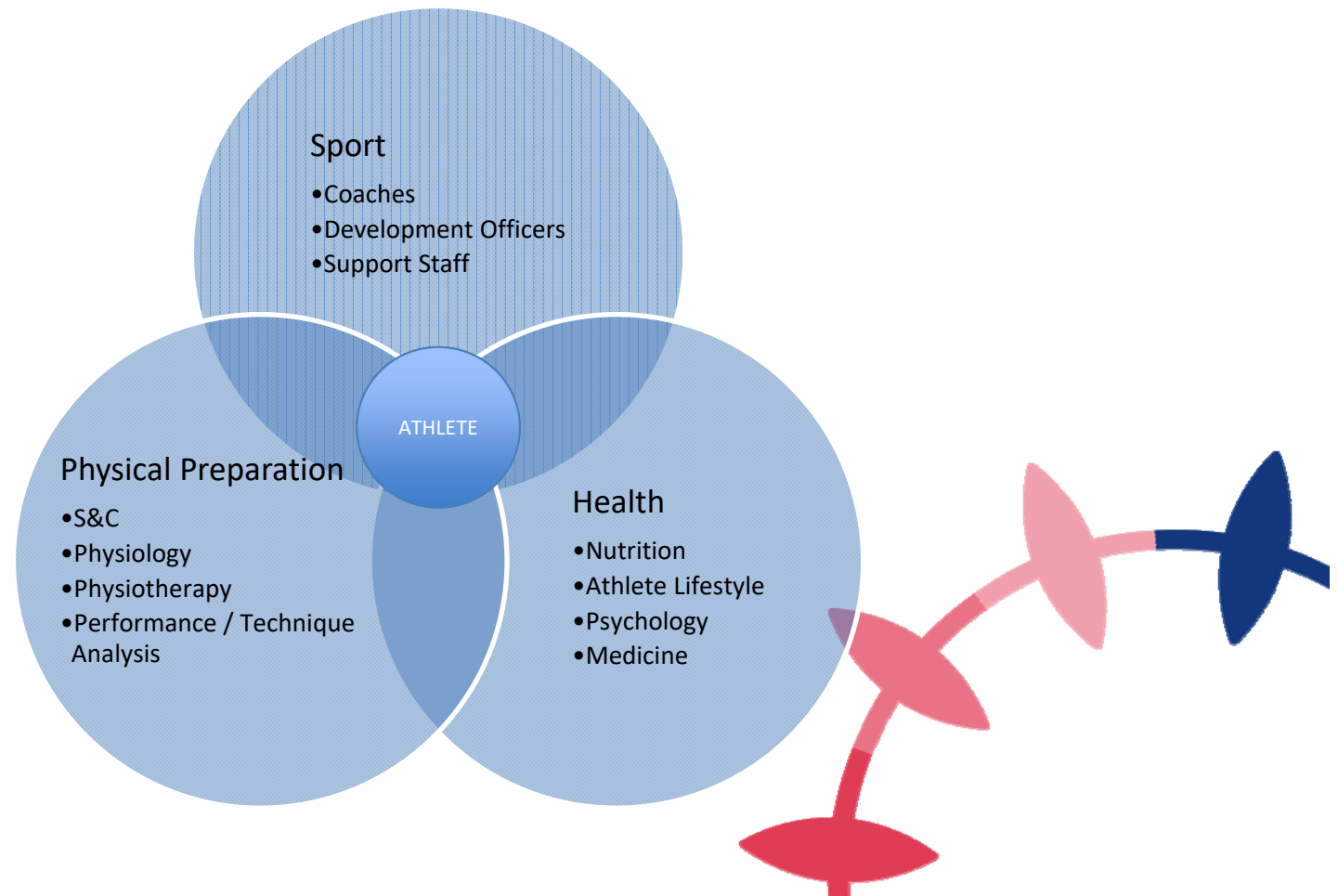
“ an integrated transdisciplinary approach to optimising athlete & coach performance while concurrently enhancing physical, mental & social well-being”



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# Performance Health Team



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## Components of Performance Health

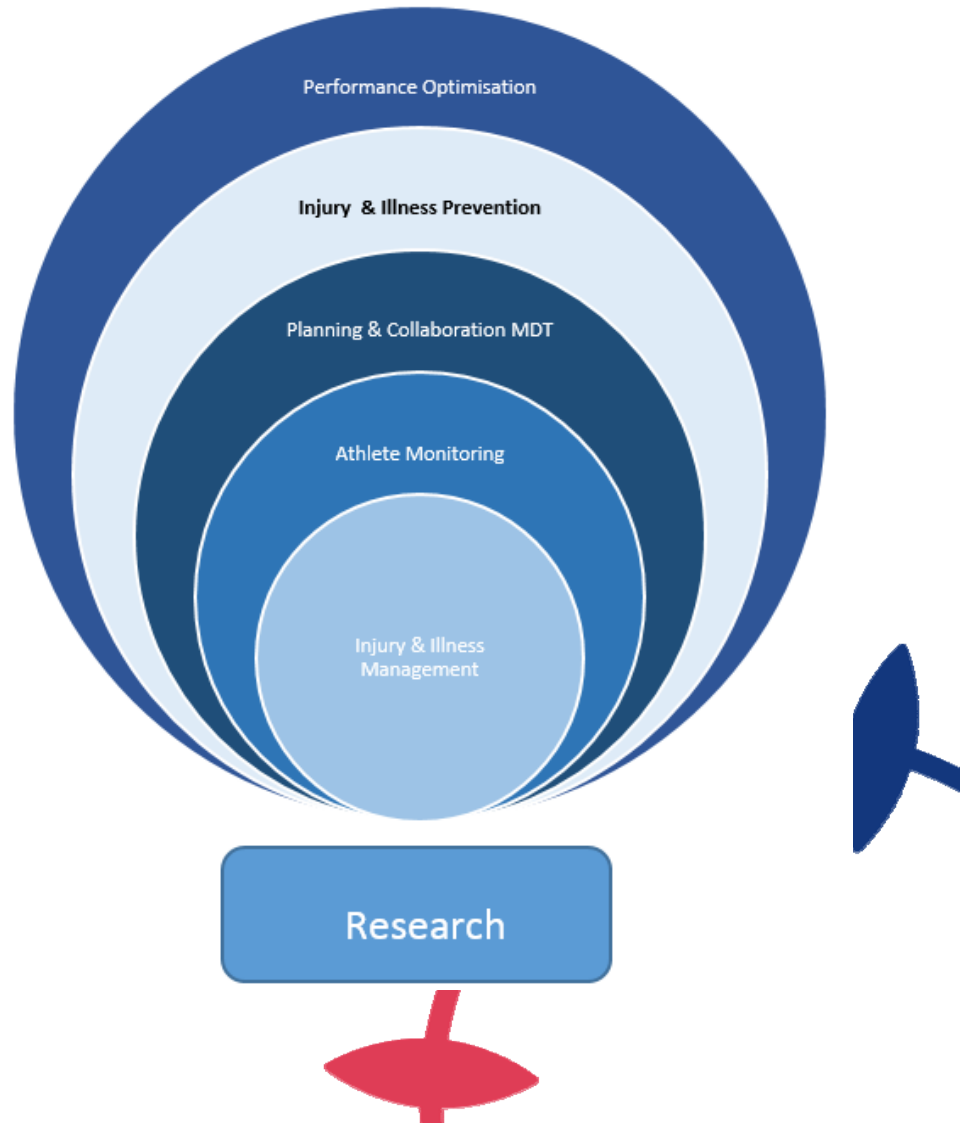
Injury (Illness) Management  
*Reaction*

Athlete Monitoring  
*Observation*

Planning & Collaboration  
*Evaluation*

Injury (Illness) Prevention  
*Implementation*

Performance Optimisation  
*Celebration*



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# Health's Basic Building Blocks

## Complete SETs

- Sleep
- Eat
- Train





# Building Block 1:

## SLEEPING YOUR WAY TO THE TOP

- Sleep is essential for recovery from and preparation for training (and life) stresses
- Five stages of sleep
  1. Pre- sleep
  2. Drifting off
  3. Deep Sleep A
  4. Deep Sleep B
  5. REM Sleep



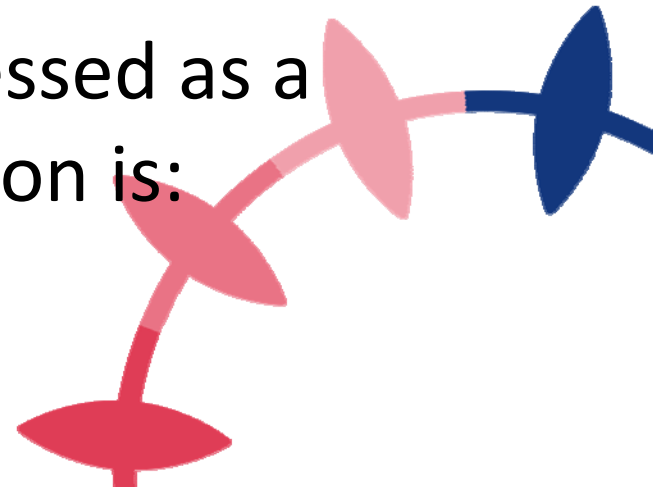
Average Human Requirement:  
7-9hrs per night



I'm not average, so I don't need  
THAT much sleep

Number of people who can survive  
on 6 hours of sleep or less, without  
showing any impairment, rounded to  
a whole number and expressed as a  
percent of the population is:

**ZERO**



# Common sense about sleep

- Sleep, as a state, must be important because it makes no sense otherwise
  - You are not safe (susceptible to predation)
  - You are not hunting
  - Not finding a mate or reproducing
  - You are not caring for your young
- Humans are the only species that denies itself sleep except in times of starvation and predation

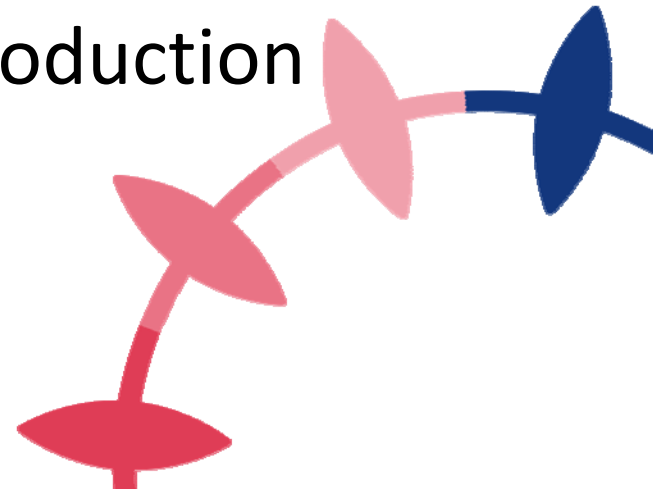
**If it is not important, it's the biggest physiological goof up  
Mother Nature ever made**



## Another good selling point

Sleep is the safe, legal and cheap way to access banned substances

- HGH and testosterone production peak during deep sleep!



# Quality Sleep Deprivation

Sleeping 6 hrs per night (or less) does bad things to performance

Day 1 to day 3

- Decreased performance on ANY performance measure
  - Subjective Awareness of poor performance

Day Four

- Performance decreases continue
  - Subjective awareness fades

Day 11

- Performance levels drop to the same as if you had stayed awake x 24hrs
  - Performance level the same as BAC 0.1 – legally drunk

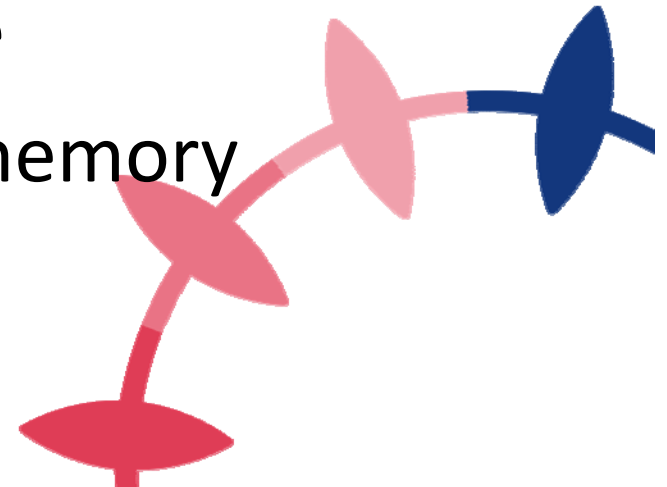
Day 22

- Performance as per being awake x 48hrs straight



# Signs of Sleep Deprivation

1. Decreased Performance
2. Reduced Alertness
3. Impulsivity
4. Lack of ability to concentrate
5. Difficulties with learning & memory
  - This includes skills acquisition
6. Difficulties with behaviour

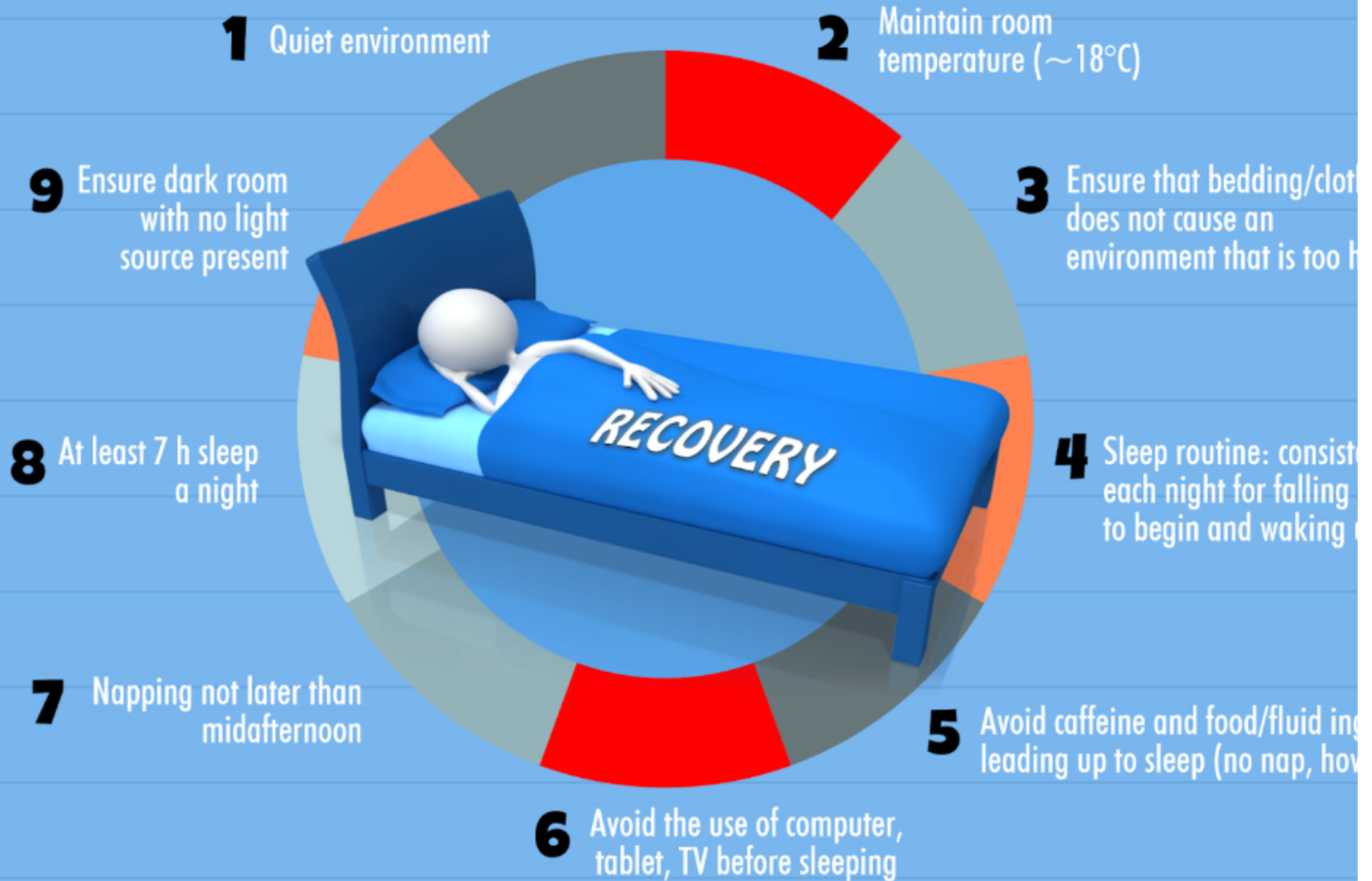


## Keys for good sleep

1. Awareness of its value
2. Regular sleep / wake cycle
3. Decreased Light Exposure
4. Cool Temperature
  - This is the biggest driver of sleep!



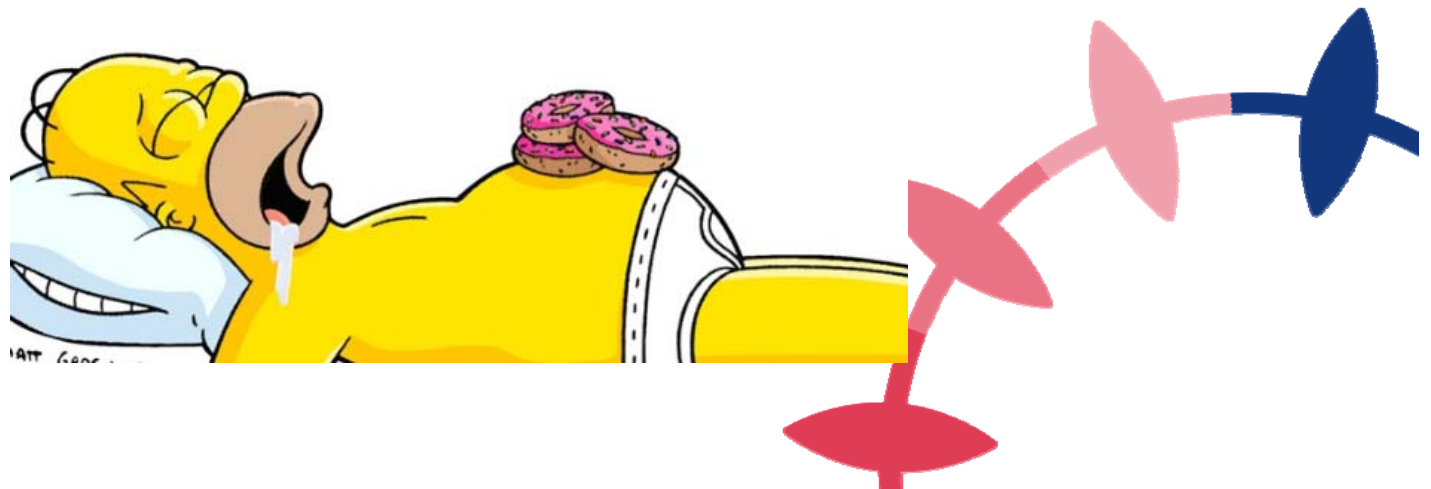
# CHECKLIST FOR ATHLETES TO CONSIDER TO ENHANCE SLEEP





## Building Block 2: EAT

A good diet on its own is not enough  
to make you a winner, but a poor diet  
can make you a loser...



# Maximise your nutrient intake

- **Energy balance** is needed to support the immune system
  - match what goes in with what goes out.
- **Fruits & vegetables** contain vitamins, minerals & antioxidants
  - needed to help combat infection & inflammation, & support immunity.
- There is no need to use any specific supplements unless this has been advised by your doctor.
  - **Eat a rainbow!**
  - **Eat a variety!**
  - **Eat  $\geq 7$  portions per day!**





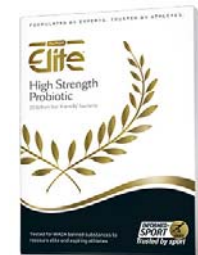
# Carbs are king!

- Carbs are fuel for your immune cells
- Sustained energy (main meals)
  - complex carbohydrates
    - (brown rice, pasta, sweet potato, oats, quinoa)
- Immediate boost (in-session)
  - In session
- Carbohydrate during or after a hard session can minimise the immunodepression that occurs after strenuous exercise.
  - Consider dilute fruit juice, sports drink, dried fruit or jelly babies during key sessions
  - Always include **carbohydrate in your recovery snack/meal** e.g. lean meat sandwich, bircher muesli, eggs on toast, yoghurt & fruit smoothie



## Probiotics

- Studies show it can lower the incidence of upper respiratory tract infections (a cold!) & therefore reduce the number of days you miss training.
- Probiotic yoghurt drinks are popular but you can get these live microorganisms in foods
  - live yoghurt, pickles, kefir, miso and sauerkraut.
- Also eat some prebiotics
  - Onions, garlic, leeks, asparagus, artichokes, bananas



## Other nutrition considerations

- Stay hydrated
  - Sip fluids little & often
- Zinc, magnesium and iron are important minerals for immune function
- Aim to **eat oily fish** twice per week to provide omega 3 fatty acids which can support immune health, & reduce inflammation & muscle soreness
  - Sardines, salmon, pilchards, mackerel, fresh tuna

<b>Zinc foods</b>	Seafood, beef, fortified cereals, cashews, chick peas, chicken, lamb, pumpkin seeds
<b>Magnesium foods</b>	Dark leafy greens, nuts, seeds, fish, beans, whole grains, avocados, yogurt, bananas, dried fruit,
<b>Iron foods</b>	Beef, pork, poultry, seafood, beans, dark green leafy vegetables, raisins, dried apricots, iron-fortified cereals, breads and pastas.

# Vitamin D



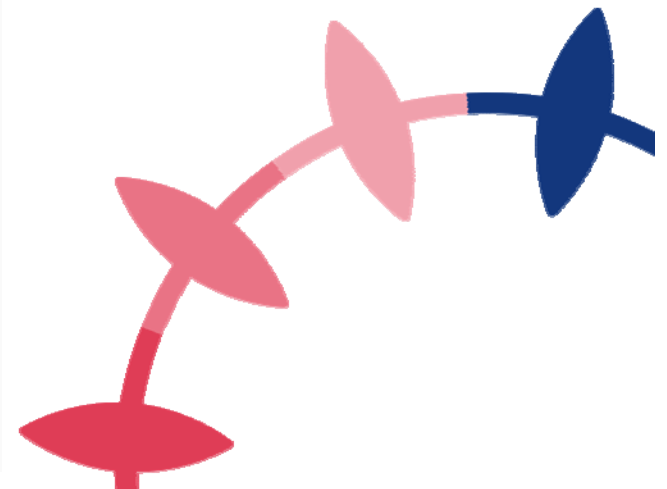
- Vitamin D: the 'sunshine vitamin'
- Our bodies can't make much during the winter.
- Vitamin D deficiency is linked to susceptibility to infection.
- Optimal vitamin D reduces viral URTI illness / Optimise MSK/bone health / Improve performance
- Aim to boost your intake through foods such as oily fish, fortified cereals, liver, cheese and egg yolks.
- Supplementation: 4000 IU



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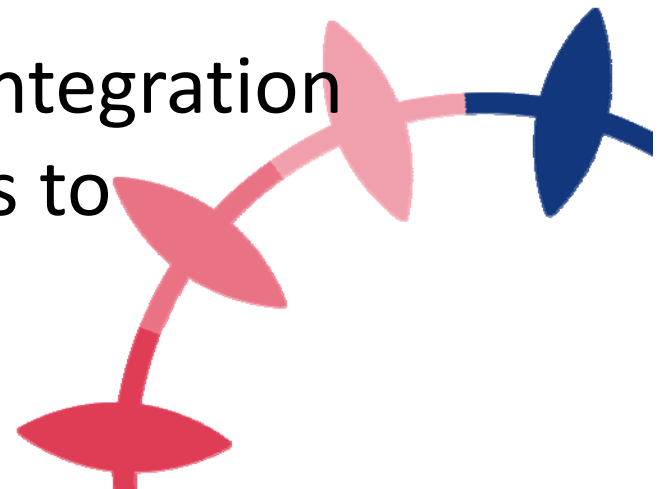
## BUILDING BLOCK 3: Training





# Performance Health Perspective

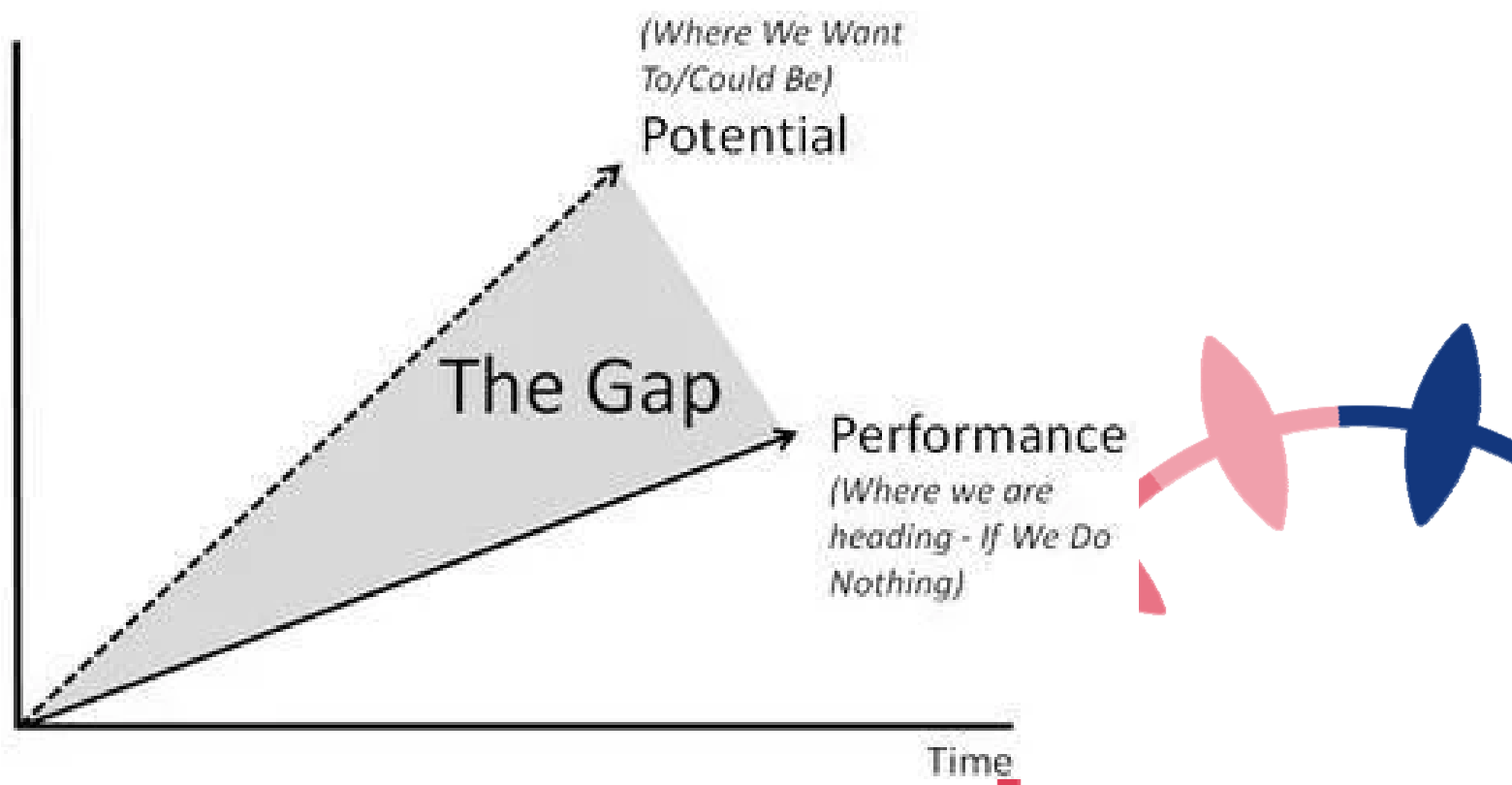
- Identifying gaps
- Proposing gap minimisation strategies
- Assisting with seamless integration of agreed upon strategies to minimise gaps and risks



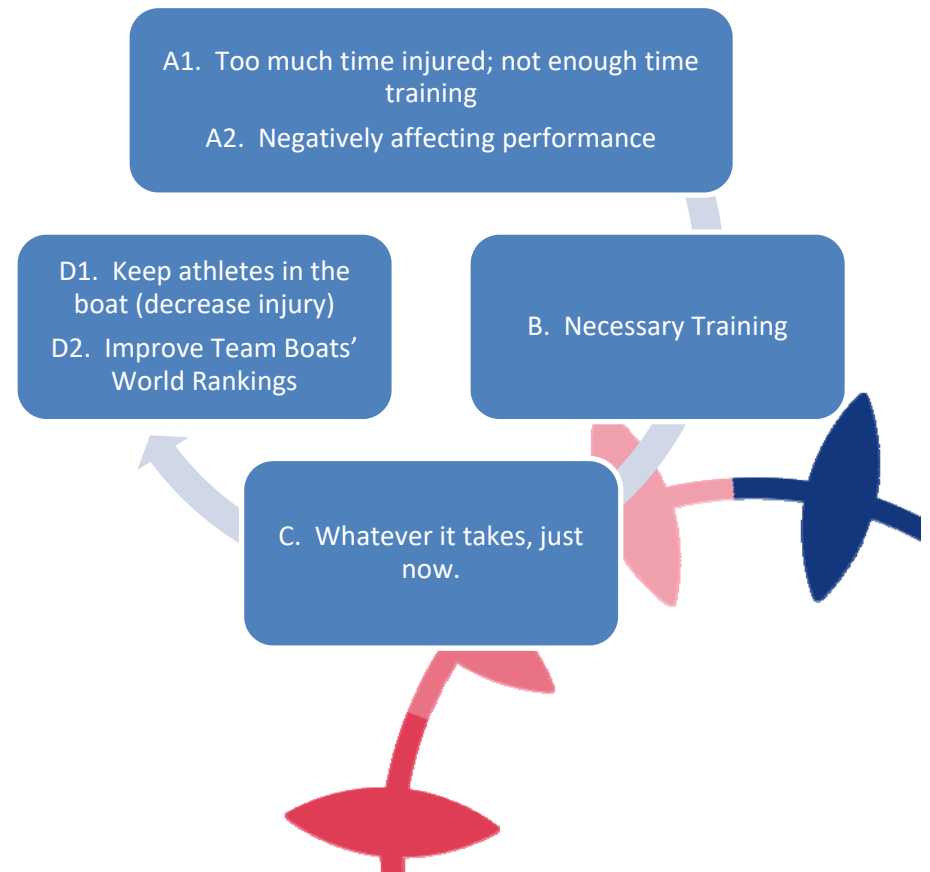
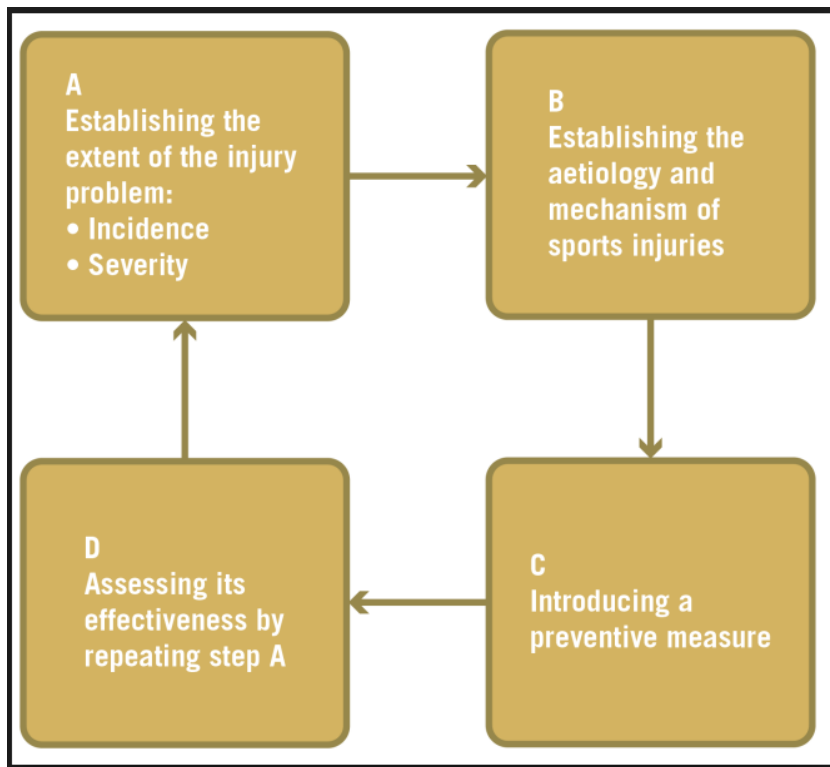
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# Identifying Gaps



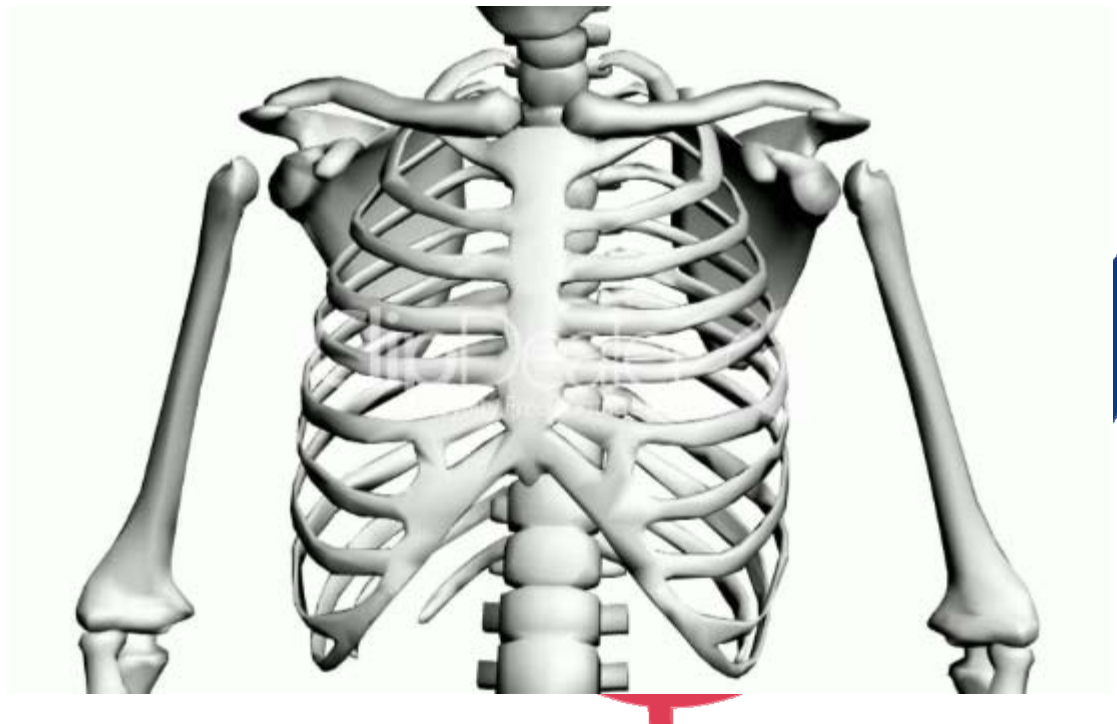
# Improving Performance Health



# What is happening in Canoe Racing?

Most frequent injuries we see:

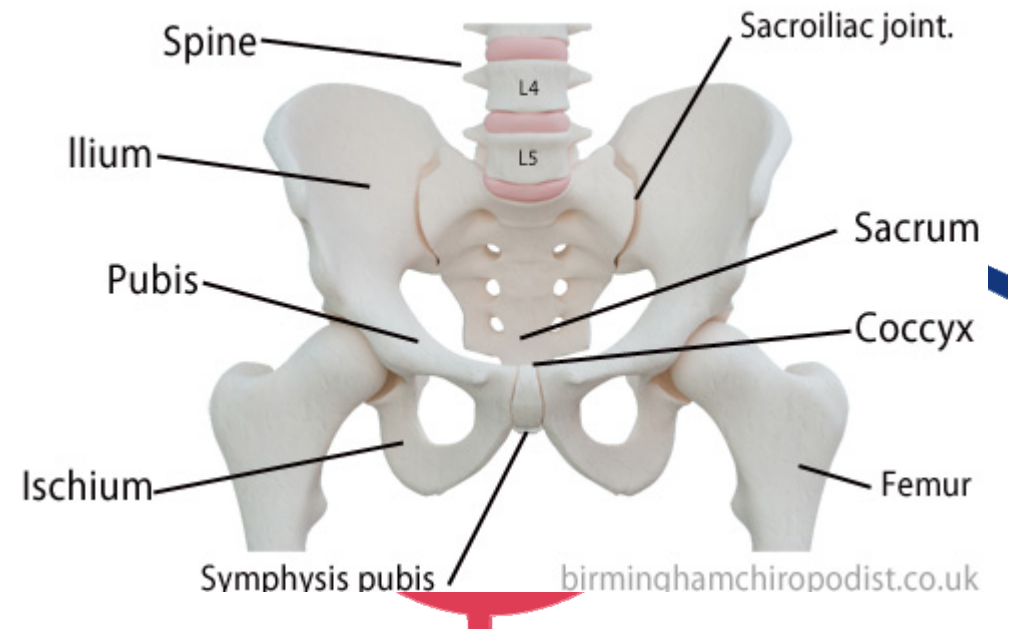
- Sternocostal
  - Joint
  - Cartilage
- Rib
  - bone
- Costovertebral
  - joint
- Thoracic Facet
  - joint



# What is happening in Canoe Racing?

Most SEVERE injuries we see:

- Lower Back / Pelvis / Sacrum / Hips
  - Lumbar Disc
    - Ligament
  - Lumbar Facet
    - Joint



# What are our risk factors for injury?

## Technique

- Paddling
  - Not a natural movement



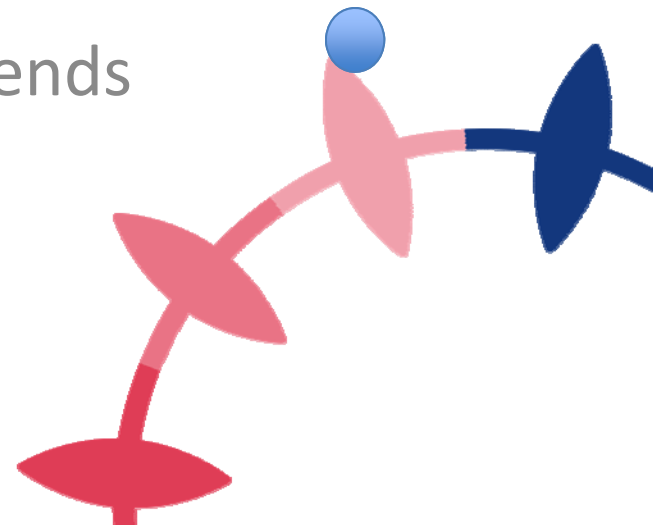
- Gym
  - Not always perfect



# What are our risk factors for injury?

## Stress

- Training
  - Paddling / Gym
- Non Training
  - School / Work / Family / Friends





# What does this mean?

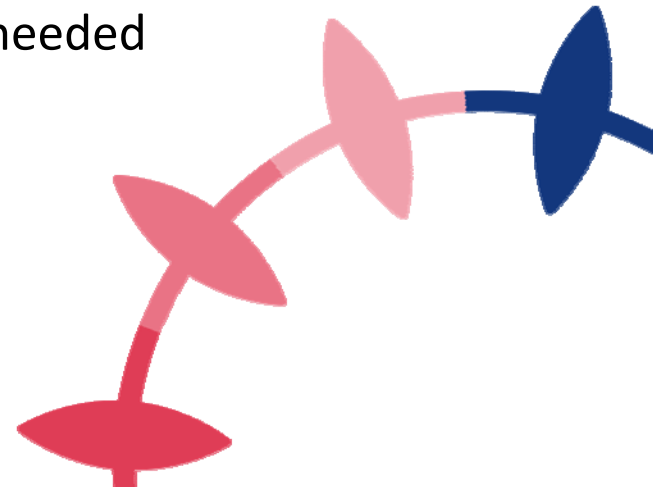
We have

- Young, big, strong athletes working to failure in a non-human pattern
- Minor technical issues under load
  - Gym and paddling
- Non contractile, small joint injuries
- Less than ideally structured mobility program



# What does ACTUALLY mean?

- Problem is NOT muscle size
- Technical issues are at ends of ROM
  - Where a lack of “small” joint protection exists
- End ROM was not being accessed in training
- “Backs” are not able to withstand the technical load of training
- CORE STABILITY through range full ROM needed improvement.



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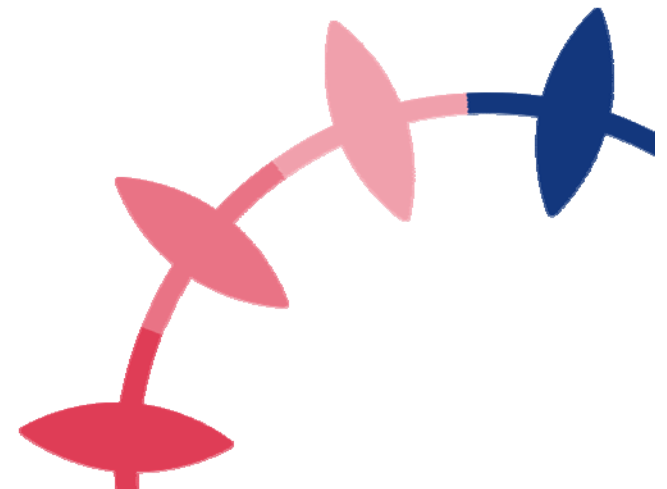


# Practical Terms

## High Performance Machines



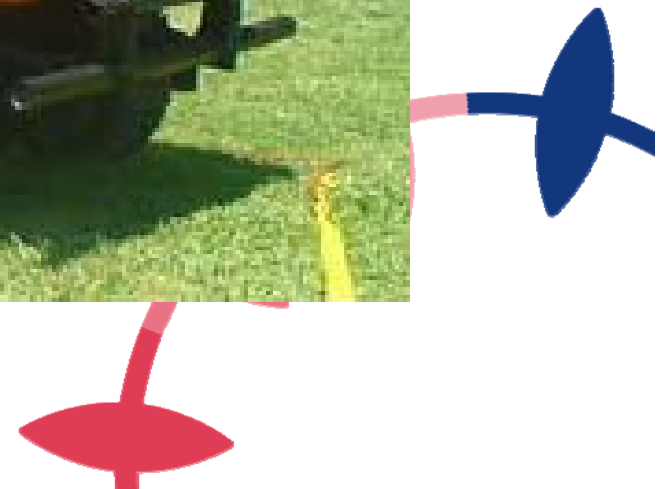
## Failing Transmissions



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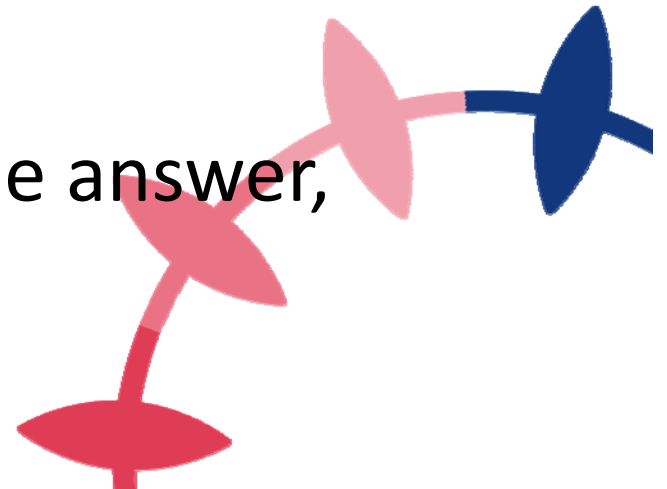
How do we fix this?



## In athlete terms?

There are very few questions in sports performance physiotherapy where **STRENGTH** is not the answer...

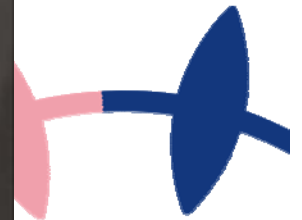
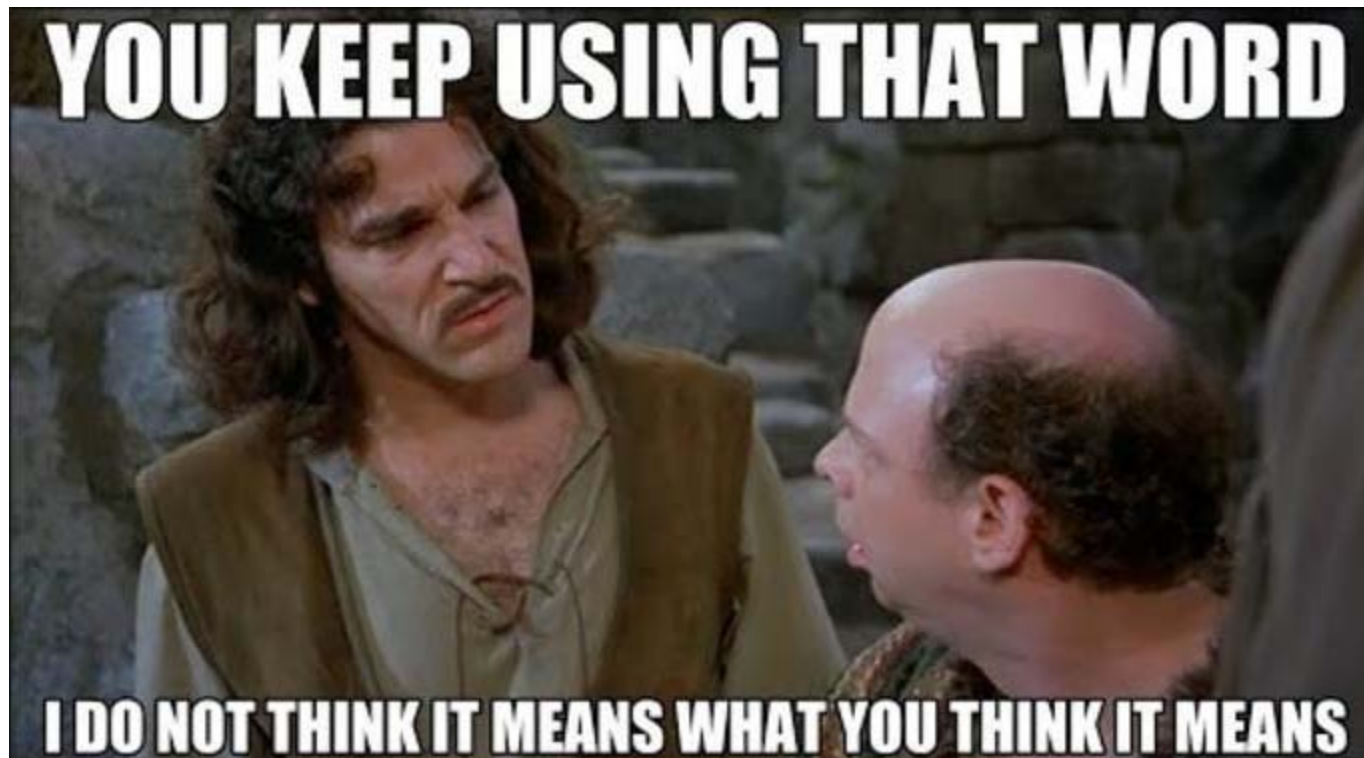
And when strength is not the answer, **CORE STABILITY** usually is...



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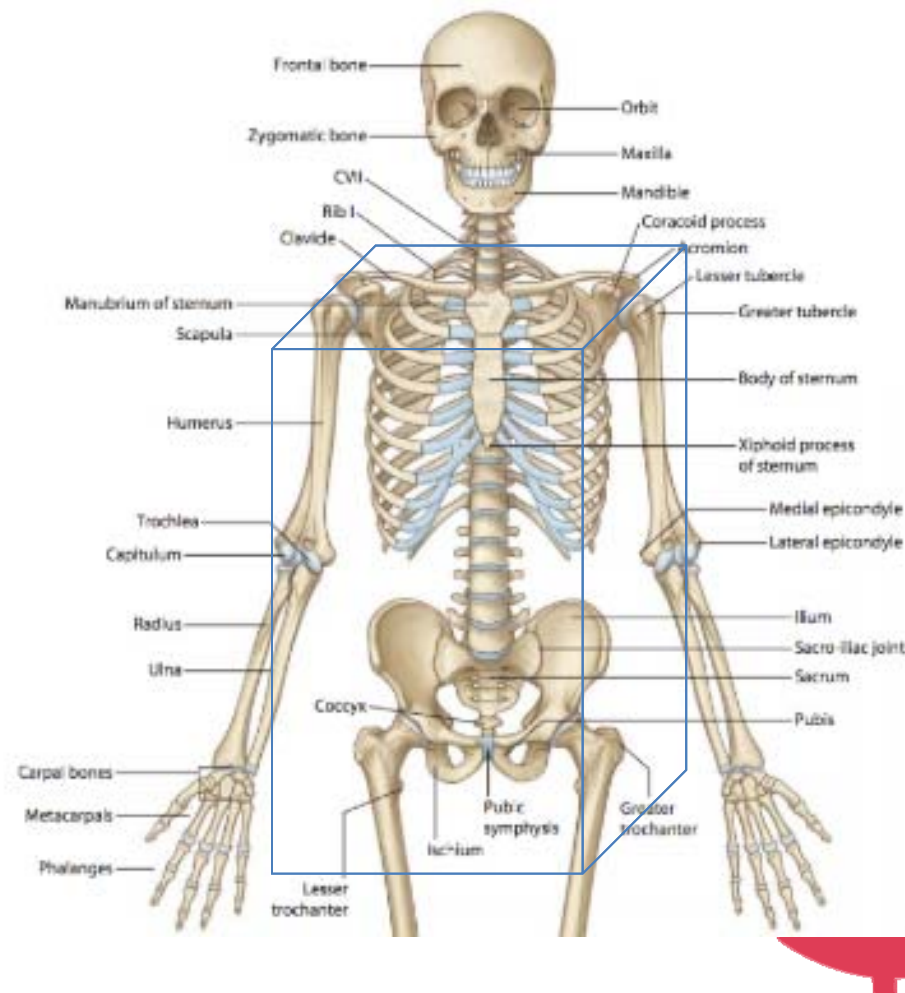
**What EXACTLY is the “CORE”**



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## Filling the Void

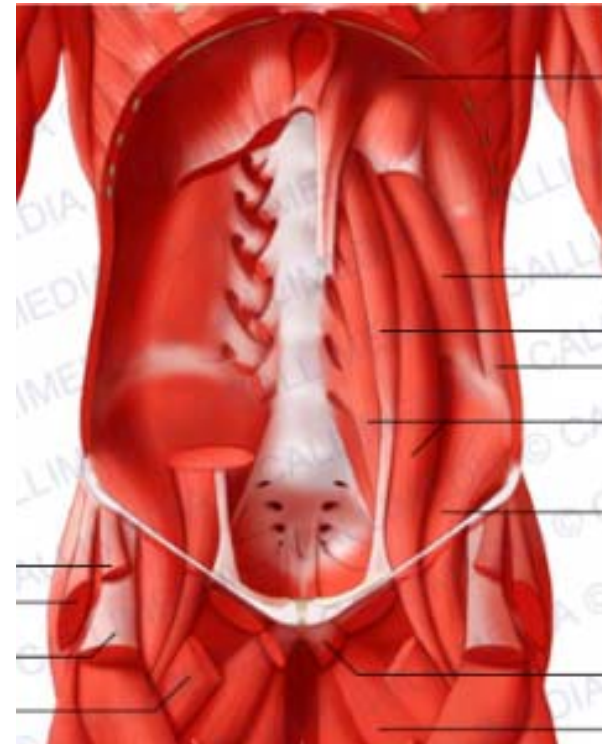




## An Anatomists' Look at the “CORE”

### Anatomical Slings: Divisional / Horizontal

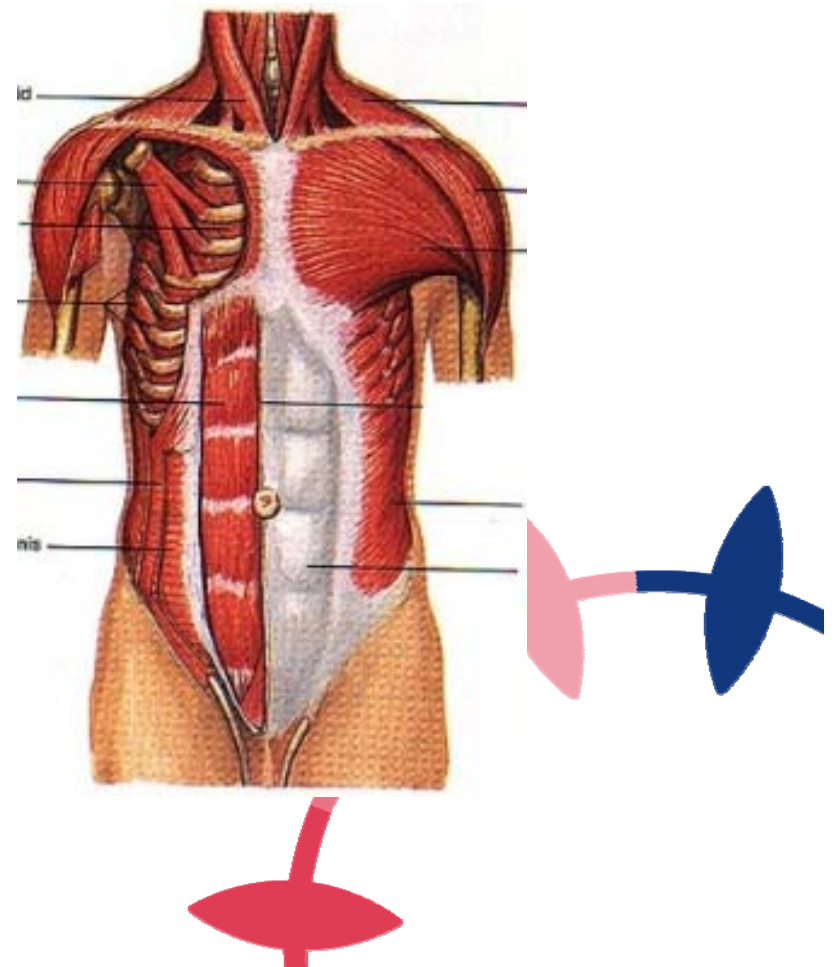
- Superior
  - Diaphragm
- Middle
  - Transversus Abdominus
- Inferior
  - Pelvic Ring
  - Pelvis Floor



## An Anatomists' Look at the “CORE”

### Anatomical Slings – Anterior

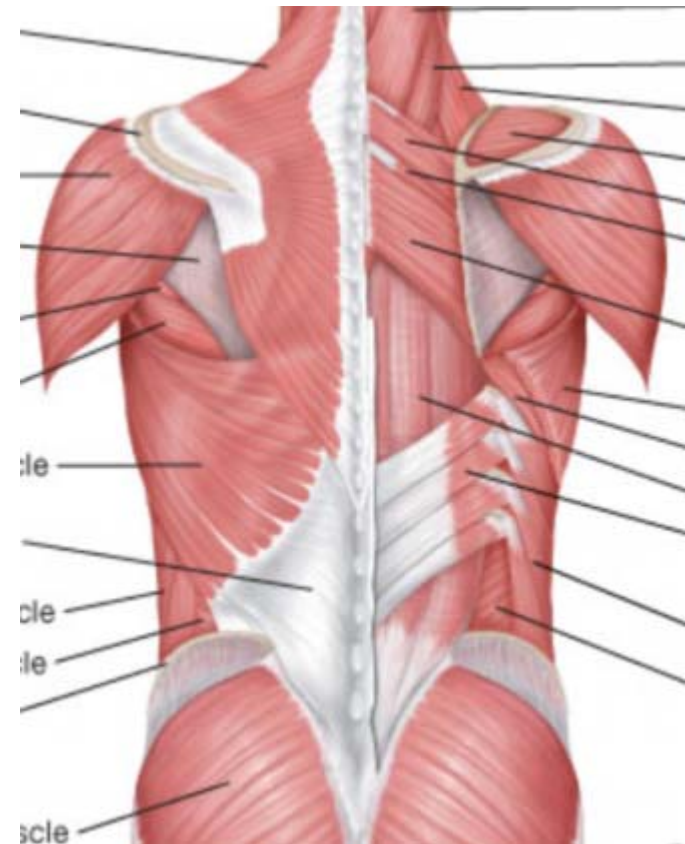
- Anterior Longitudinal
  - Rectus Abdominus
- Anterior Oblique
  - External Oblique
  - Contralateral Internal Oblique
  - Pectoralis Major
  - \**Contralateral Adductor*



## An Anatomists' Look at the “CORE”

### Anatomical Slings – Posterior

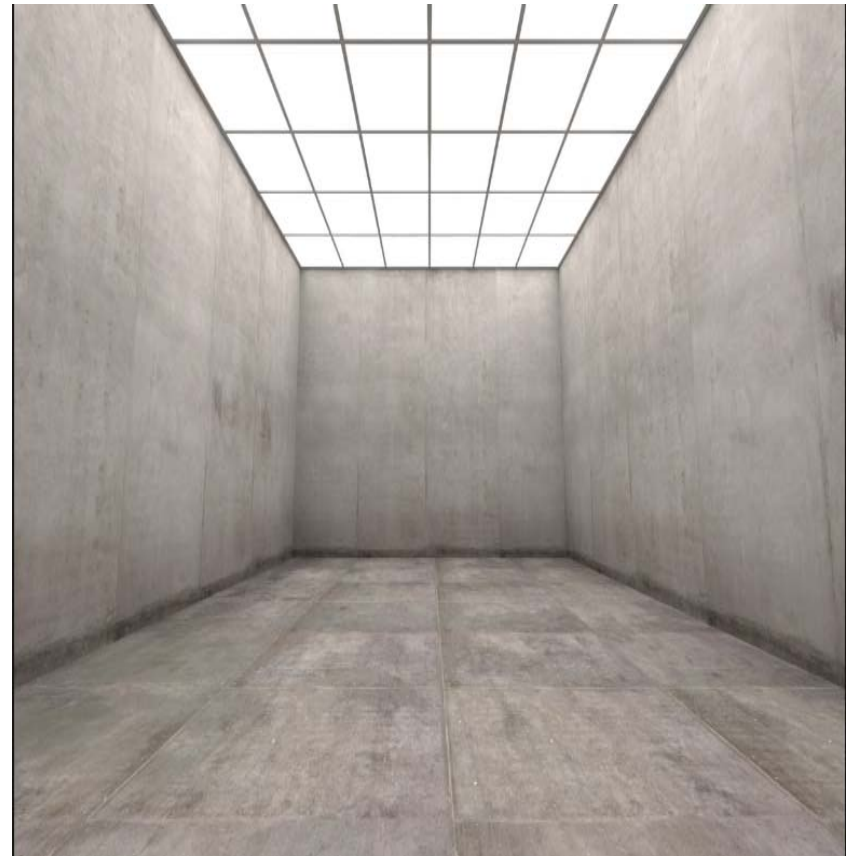
- Posterior Longitudinal
  - Multifidus
  - Thoracolumbar Fascia
- Posterior Oblique
  - Latissimus Dorsi
  - Contralateral Gluteus Maximus
  - \**LH Biceps Femoris (hamstring)*



## A Practical View of the “CORE”

### (Simplified) Room Concept

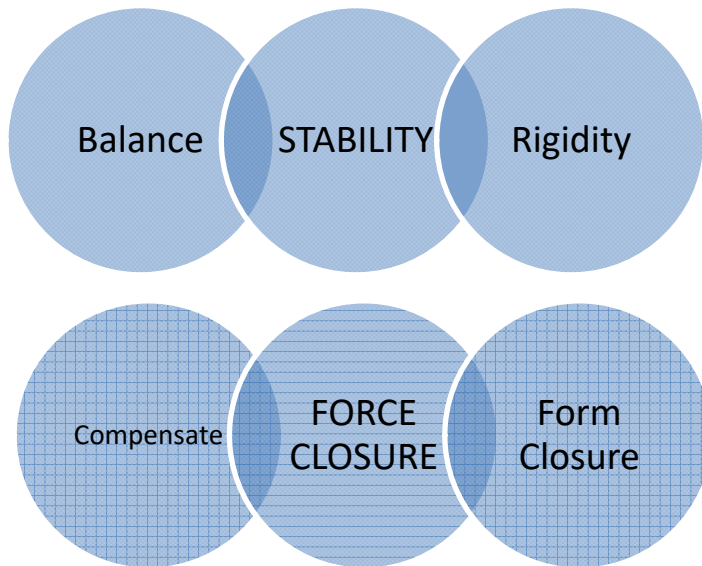
- Floor
  - Pelvic Girdle & Pelvic Floor
- Ceiling
  - Diaphragm
- Back Wall
  - Paraspinals & Gluteals
- Front & Sides
  - 4 Layers of Abdominals
- Extra Supports
  - Pec's, Lat's, Hamstrings & Adductors



# What about STABILITY and MOBILITY?

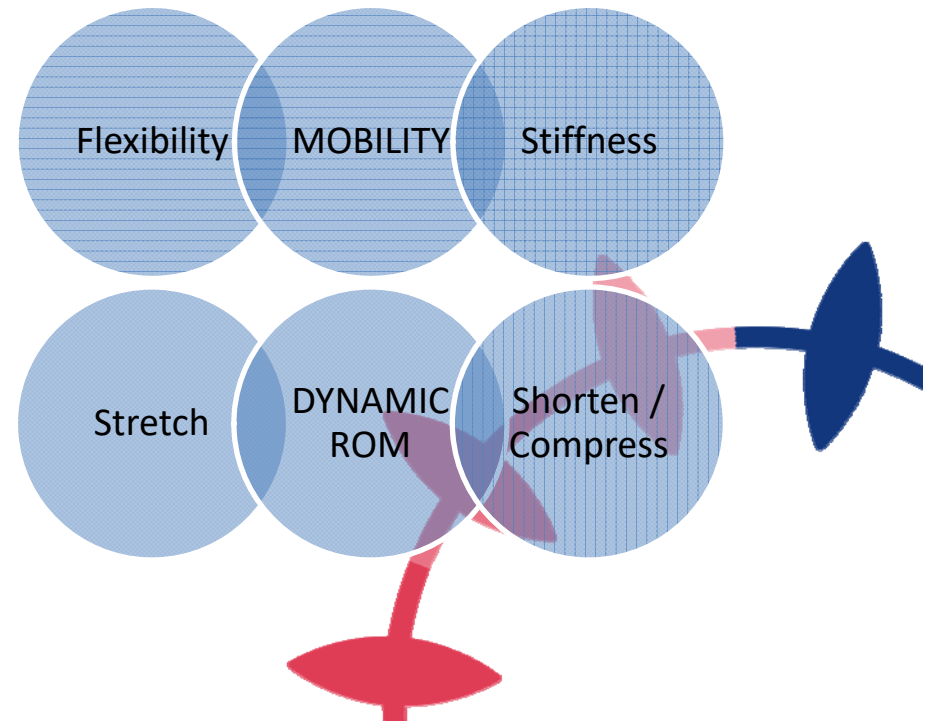
## Stability

- Steadiness spectrum



## Mobility

- Movement spectrum



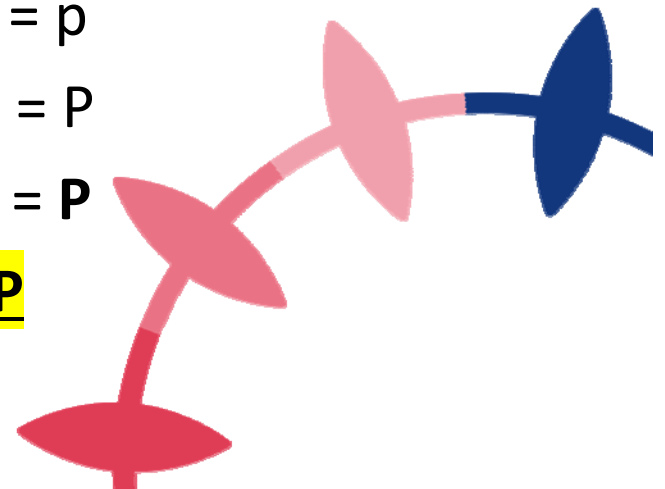
## PHYSICS and PHYSIOLOGY

### Strength, Work & Power?

- Force (N or kg.m/s/s)
  - mass x acceleration
- Work (N.m or J)
  - Force x ROM, or
  - Force x Distance
- Power (W or N.m/s)
  - Work / Time

### How do we get it?

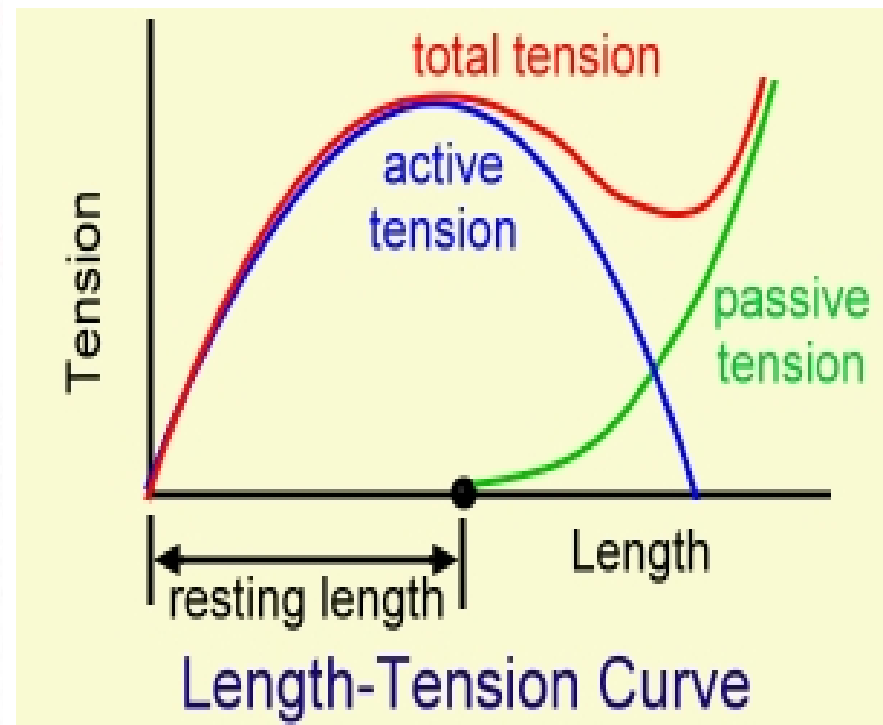
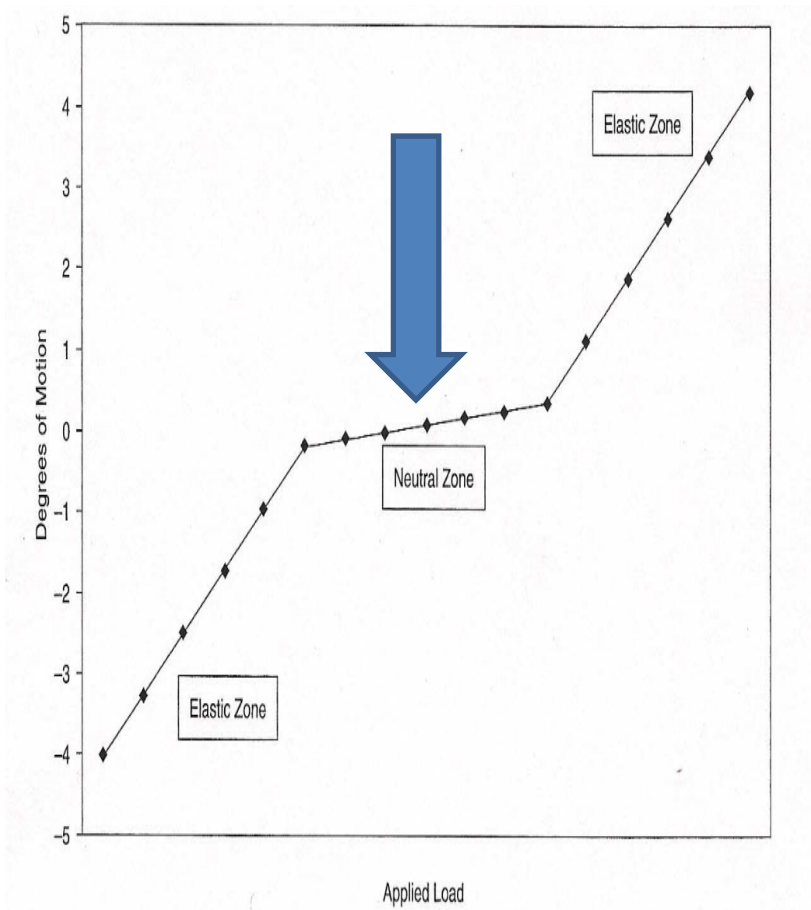
- Cross Sectional Area (A)
  - Muscle mass
- Neural Recruitment (B)
  - Better engagement
- $a + b = p$
- $A + B = P$
- $A \times B = P$
- $A^B = \underline{P}$



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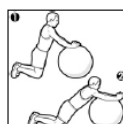
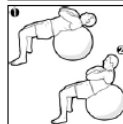

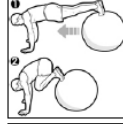
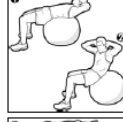


## Why is mobile core stability important?



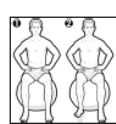
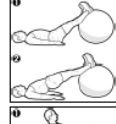

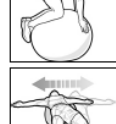

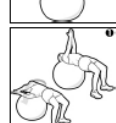




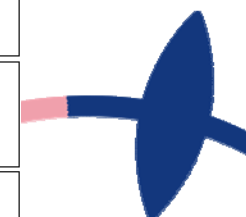
## How do we start?

### Core Stability 1 (rigid)

	<b>SWISS BALL ROLL-OUT</b> Kneeling behind the Swiss ball with your hands (or forearms) resting on the ball (1), roll the ball out as far as you can while keeping the lumbar spine in a neutral position (2). Ensure your back does not arch as you roll the ball out. Roll the ball back and repeat.
	SETS & REPS: 3 x 10-12      FREQUENCY: 3-4 x week
	<b>SWISS BALL ABDOMINAL CRUNCH</b> Lying over the Swiss ball with your arms crossed on your chest or unclasped behind your head (1), curl your shoulders and upper back off the ball (2). Slowly lower and repeat.
	SETS & REPS: 3 x 10-15      FREQUENCY: 3-4 x week
	<b>SWISS BALL BACK EXTENSIONS</b> Lie over the Swiss ball with your legs straight, feet on the floor and heels fixed against the wall. With your arms by your side, flex your trunk over the ball. From this position, lift your chest, extending your back until your legs and trunk form a straight line. Lower and repeat.
	SETS & REPS: 3 x 10-15      FREQUENCY: Daily
	<b>SWISS BALL JACK-KNIFE</b> With your feet on the Swiss ball and hands on the floor, assume the plank position (1). Contract your lower abdominals and maintain a neutral lumbar spine position as you tuck your knees towards your chest (2). Return to the start position and repeat.
	SETS & REPS: 3 x 15-20      FREQUENCY: 3-4 x week
	<b>SWISS BALL OBLIQUE CRUNCH</b> Lying flat on the Swiss ball with your hands unclasped behind your head (1), curl your shoulders and upper back off the ball, twisting your trunk towards your opposite hip (2). Slowly lower and alternate sides.
	SETS & REPS: 3 x 15-20      FREQUENCY: 3-4 x week
	<b>SWISS BALL ARM / LEG LIFTS &amp; SUPERMANS</b> While lying over a Swiss ball, assume a 'neutral' lumbar position and contract your lower abdominals. Raise one arm (1) then lower. Extend the opposite leg out straight (2) then lower. Then simultaneously raise the arm and opposite leg (3) then lower. Ensure your hips, spine and shoulders remain still throughout the movements. Alternate sides.
	SETS & REPS: 3 x 15-20      FREQUENCY: Daily
	<b>SWISS BALL OBLIQUE CURL</b> Lie on your side over the Swiss ball with one foot in front of the other and fixed against the wall. With your arms crossed over your chest, side-flex your trunk over the ball. From this position, raise your top shoulder towards the wall as far as you can. Lower and repeat.
	SETS & REPS: 3 x 10-15      FREQUENCY: Daily

### Core Stability 2 (balance)

	<b>SWISS BALL SITTING: LEG LIFTS</b> While sitting on a Swiss ball, maintain a 'neutral' spine position (1). Lift each leg alternately while maintaining this position (2). Repeat 15-20 times each leg.
	SETS & REPS: 1-3 x 10-20      FREQUENCY: Daily
	<b>SWISS BALL BRIDGE</b> Lying on your back with your arms by your side and heels on the Swiss ball (1), contract your abdominals and gluteals while you raise your hips up until your legs and body are in-line (2). Slowly lower and repeat.
	SETS & REPS: 3 x 10-12      FREQUENCY: Daily
	<b>SWISS BALL SUPINE BRIDGE</b> Start with your shoulders on the Swiss ball, knees bent to 90° and feet flat on the floor (1). Contract your gluteals and raise your hips as high as you can (2). Slowly return to the start position (1) and repeat.
	SETS & REPS: 3 x 15      FREQUENCY: Daily
	<b>SWISS BALL 4-POINT KNEELING</b> Maintain your balance on the Swiss ball on your hands and knees while keeping your lumbar spine in a neutral position.
	SETS & REPS: 3 x 1min      FREQUENCY: Daily
	<b>SWISS BALL SUPINE LATERAL ROLL</b> From sitting, roll down the ball so your head and shoulders rest in the middle of the ball. Contract your lower abdominals and gluteals to extend your hips and flatten your back. Stretch your arms out to the side so they are parallel with the floor, with palms facing up. Maintain this position and move as far as you can to one side. Repeat to the opposite side.
	SETS & REPS: 10 each side      FREQUENCY: 3-4 x week
	<b>SWISS BALL 2-POINT KNEELING</b> Kneel on the Swiss ball and maintain your balance.
	SETS & REPS: 3 x 1min      FREQUENCY: Daily
	<b>SWISS BALL SUPINE TWIST</b> With your shoulders on the ball, hips extended and hands above your head (1), rotate your arms as far as you can to each side (2). Contract your lower abdominals and keep your hips up throughout the exercise.
	SETS & REPS: 3 x 15-20      FREQUENCY: Daily
	<b>SWISS BALL HAMSTRING CURLS</b> With your heels on a Swiss ball and arms flat on the floor for support, contract your lower abdominals and raise your hips off the floor until your legs and body form a straight line (1). Bend your knees, rolling the ball towards you (2). Slowly straighten your knees and repeat.
	SETS & REPS: 3 x 10-12      FREQUENCY: Daily

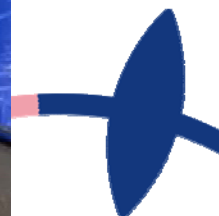
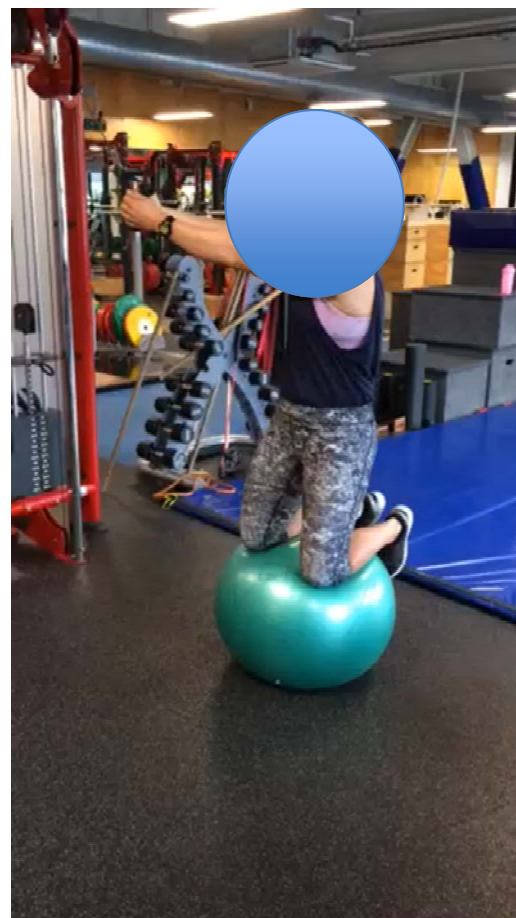




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## How do we progress?



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**Where is it gonna go?**



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Where will it take us?



## A quick review...

A happy, healthy performance team:

- Sleeps well
  - 7-9hrs / night
- Eats well
  - Has a balanced diet rich in fruit & vege
- Trains well
  - Goes Hard Core!

