

# “Gold in spite of shoulder pain! How it’s done!”



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15th August 2016, Rio Olympic games TV in physio area



1st treatment 20 days prior Kazan  
world championship 2015.

Main goal: Río Olympic Games  
2016



1st treatment 40 days prior Río  
Olympic Games 2016





# Time line

Day 0

- Checking glenohumeral Range of movement (ROM)+ Glenohumeral Deblocking manoeuvre (“GDM” ) before a swimming meeting
- June 7th

Day 1

- MM + Deep massage therapy + Stretching + Vertebral Trust
- June 10th

Day 2

- Deep massage therapy + Stretching + Vertebral Trust & Showing exercises
- June 18th

# Time line

Day 3

- Deep massage therapy + Stretching + Vertebral Trust.
- June 25th.

Day 4

- Deep massage therapy + Stretching + Vertebral Trust.
- June 25th.

Day 5

- Deep massage therapy + Stretching + Vertebral Trust.
- July 2nd.

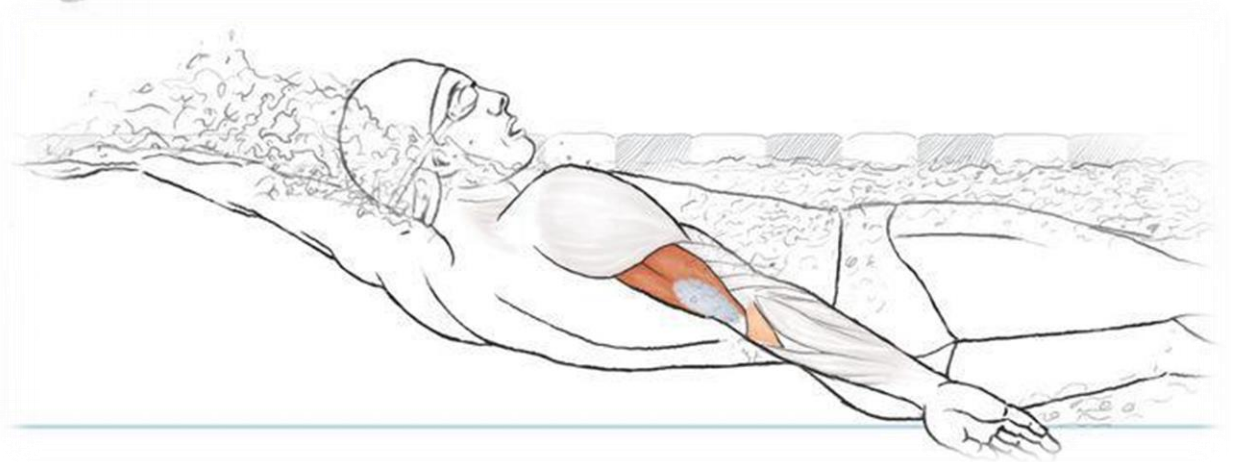
Day 6

- Check glenohumeral ROM + Deep massage therapy + Stretching + Vertebral Trust.
- July 23th

Different overhead athletes, different biomechanics

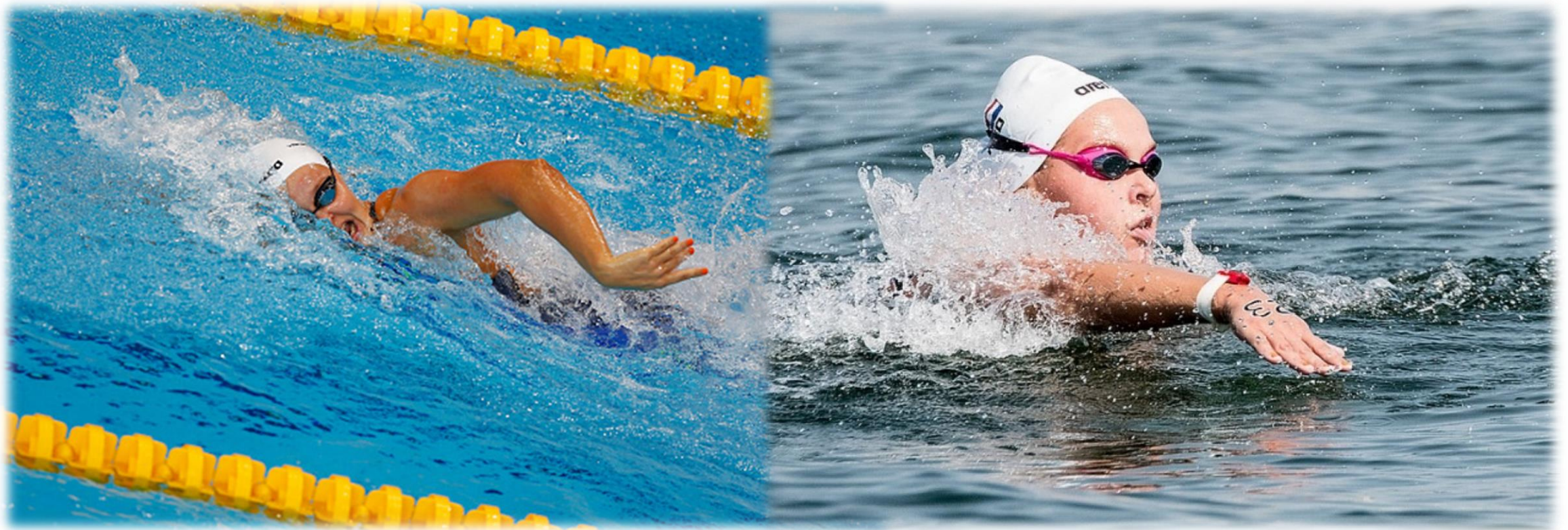


# Swimming style change shoulder biomechanics





Even same sport...different environment  
change the shoulder biomechanics





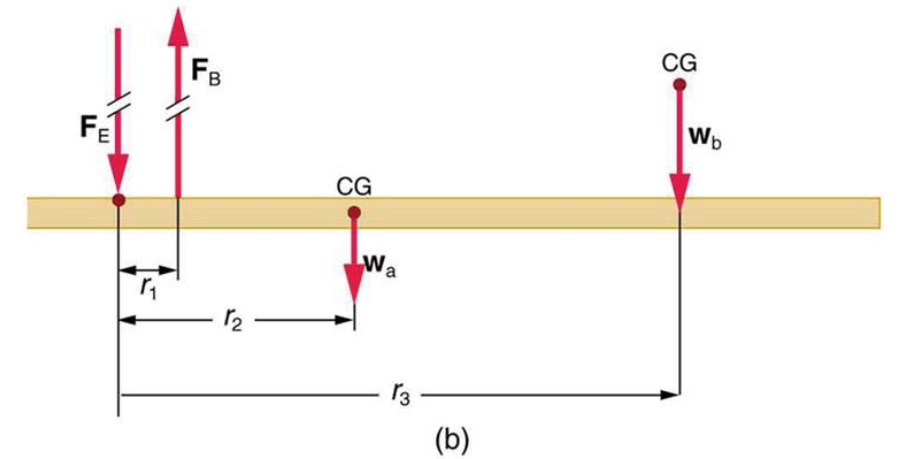
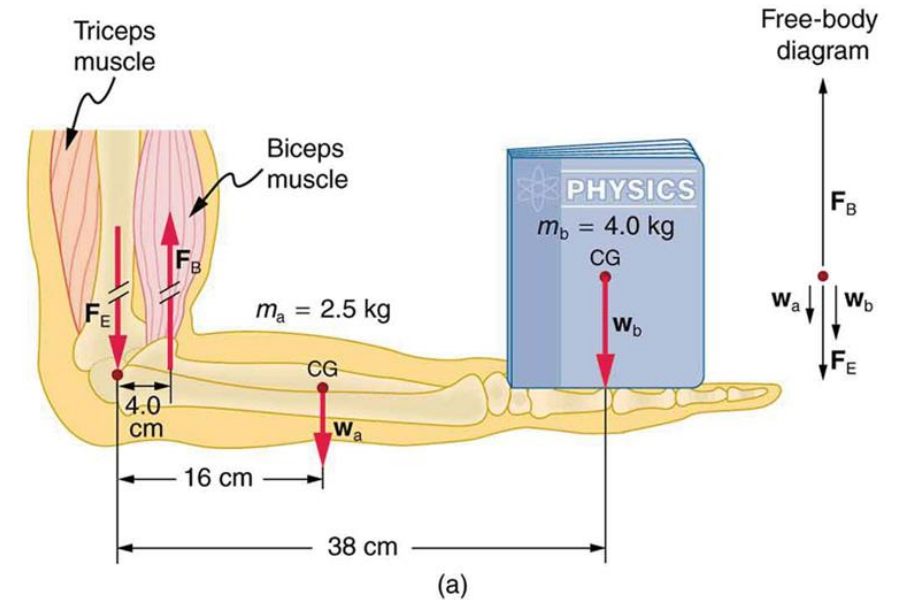
# Biomechanical factors for muscle efficiency

- Muscle length (increase power brace).
- Number of fibers.
- Attachment angle.
- Joint degrees (in which position is the joint working)
- Relation between resistance brace and power brace.
- Location of the resistance or load.

# Biomechanical factors for muscle efficiency

**Rotational Momentum**= amount of rotational movement that can be developed.

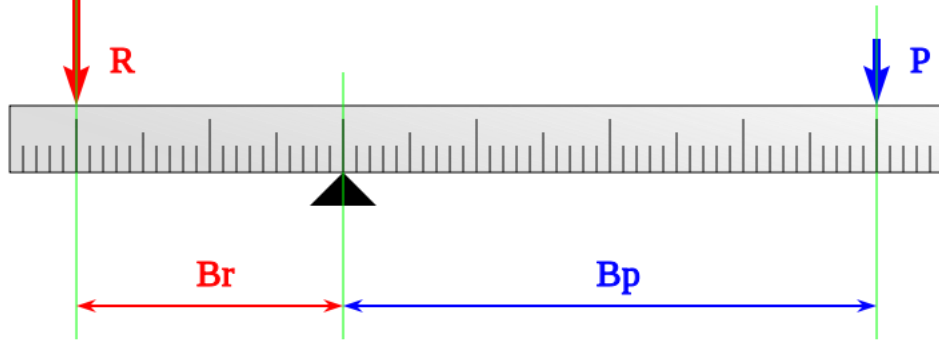
**$M = \text{Power} \times \text{Brace} \times \text{Force}$**



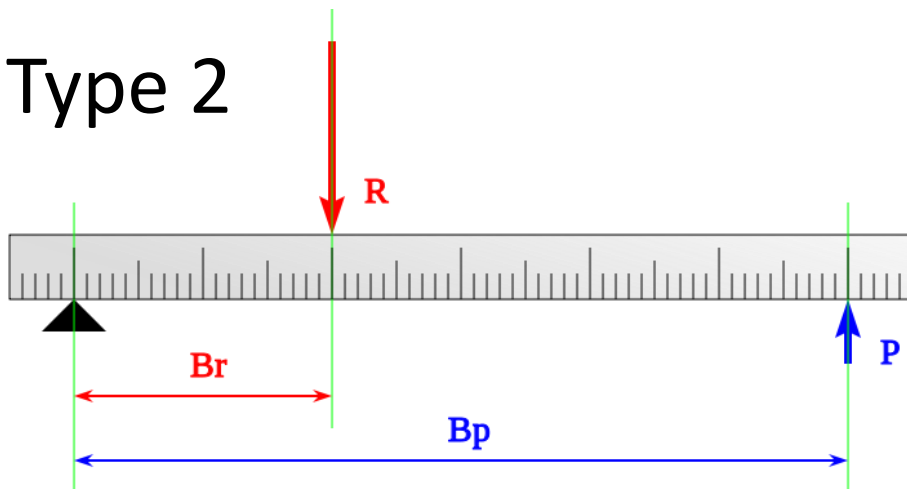
# Biomechanical factors for muscle efficiency

Power brace depends on the type of working lever and the distance between the joint and the muscle attachment

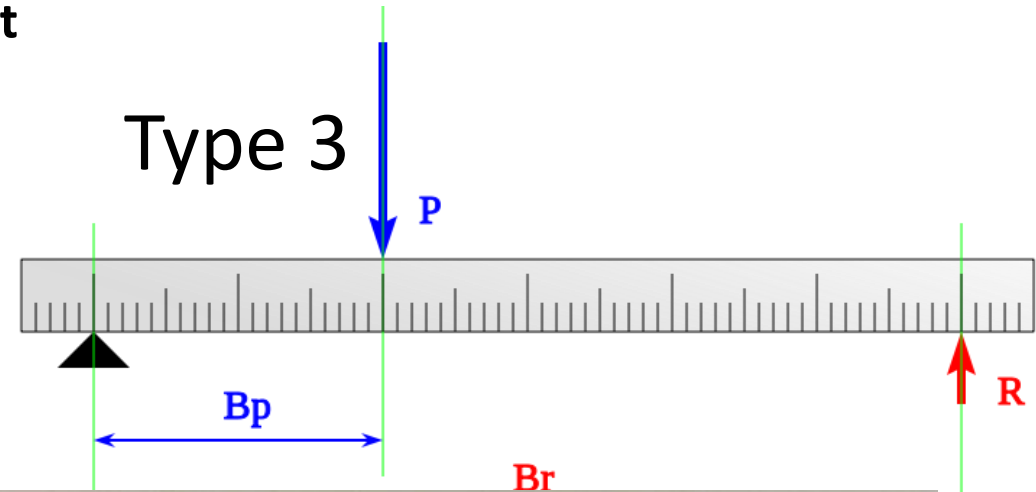
Type 1



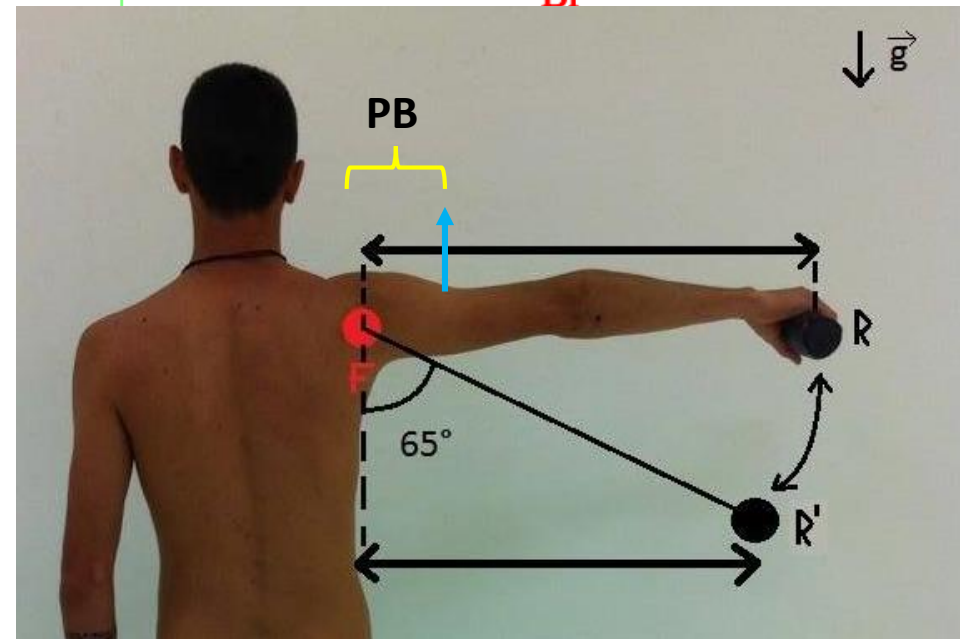
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Type 3



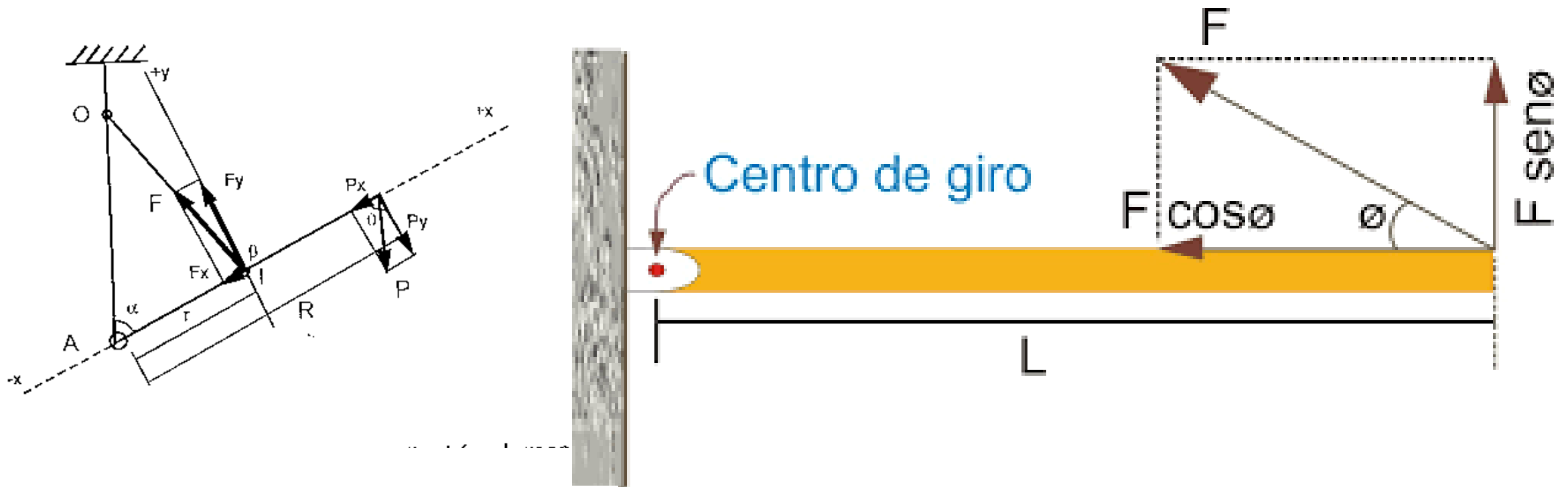
$$M = \text{Power Brace (PB)} \times \text{Force}$$





## Muscle Torque and force production

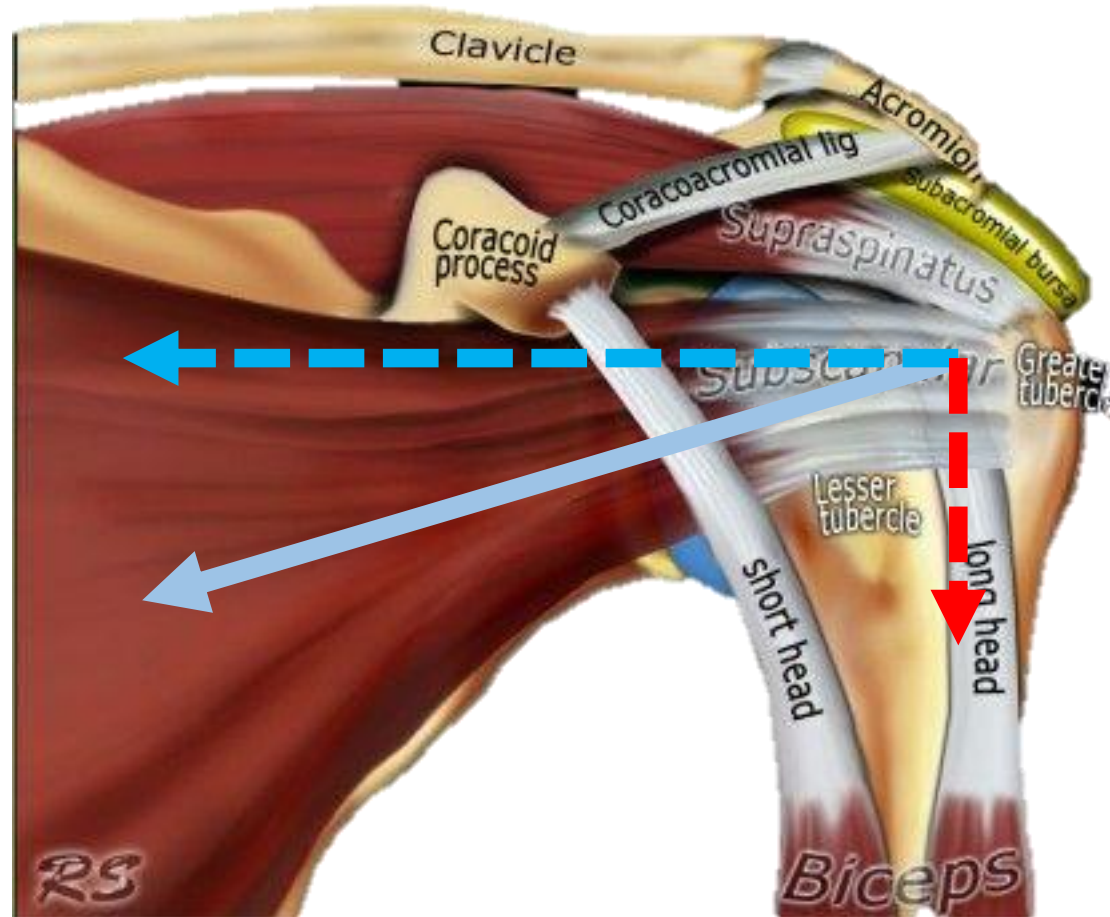
Only the perpendicular component of the muscle force ( $F_y$ ) can develop movement



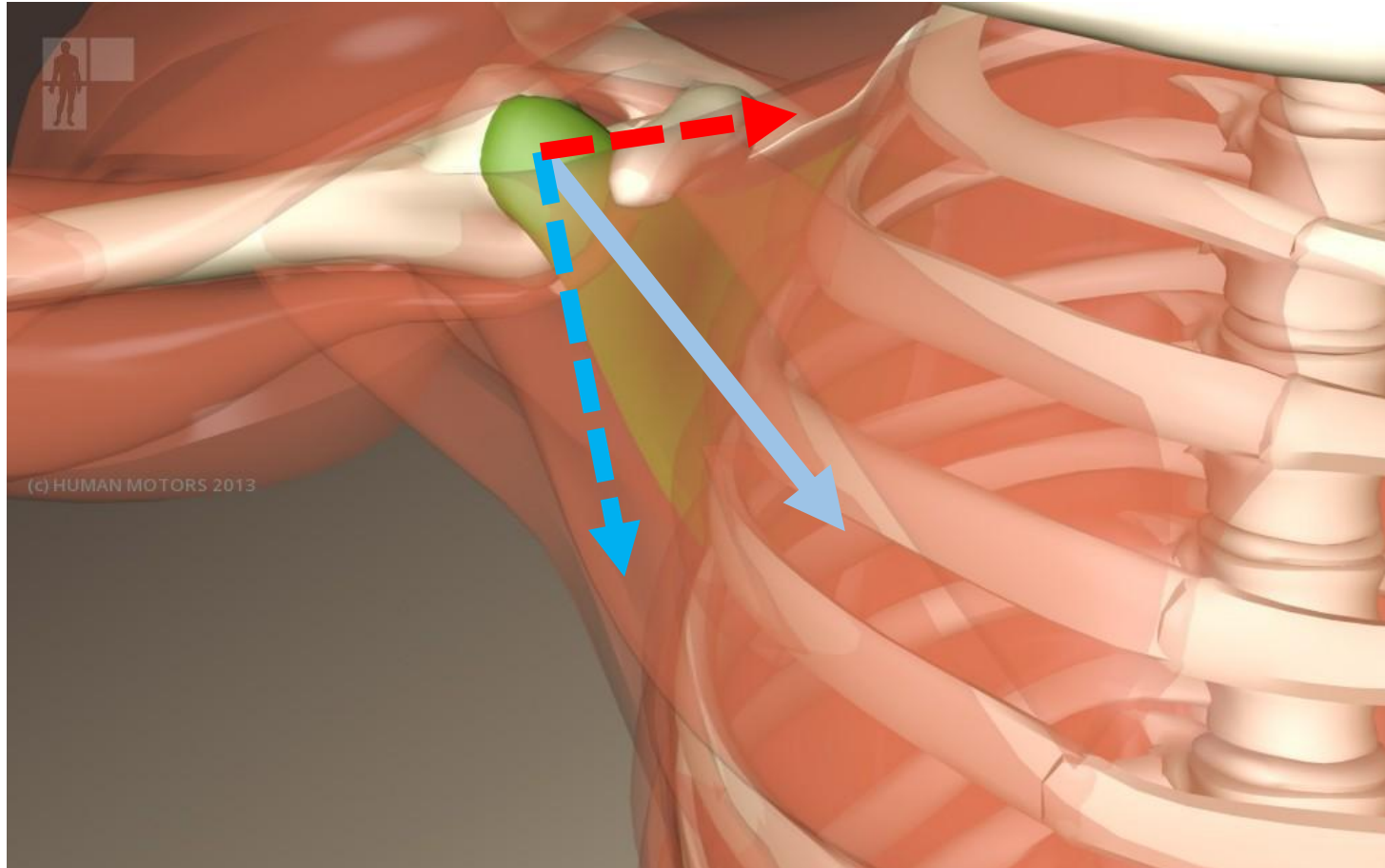
Subscapularis **torque** is higher than other internal rotators



**Subscapularis**

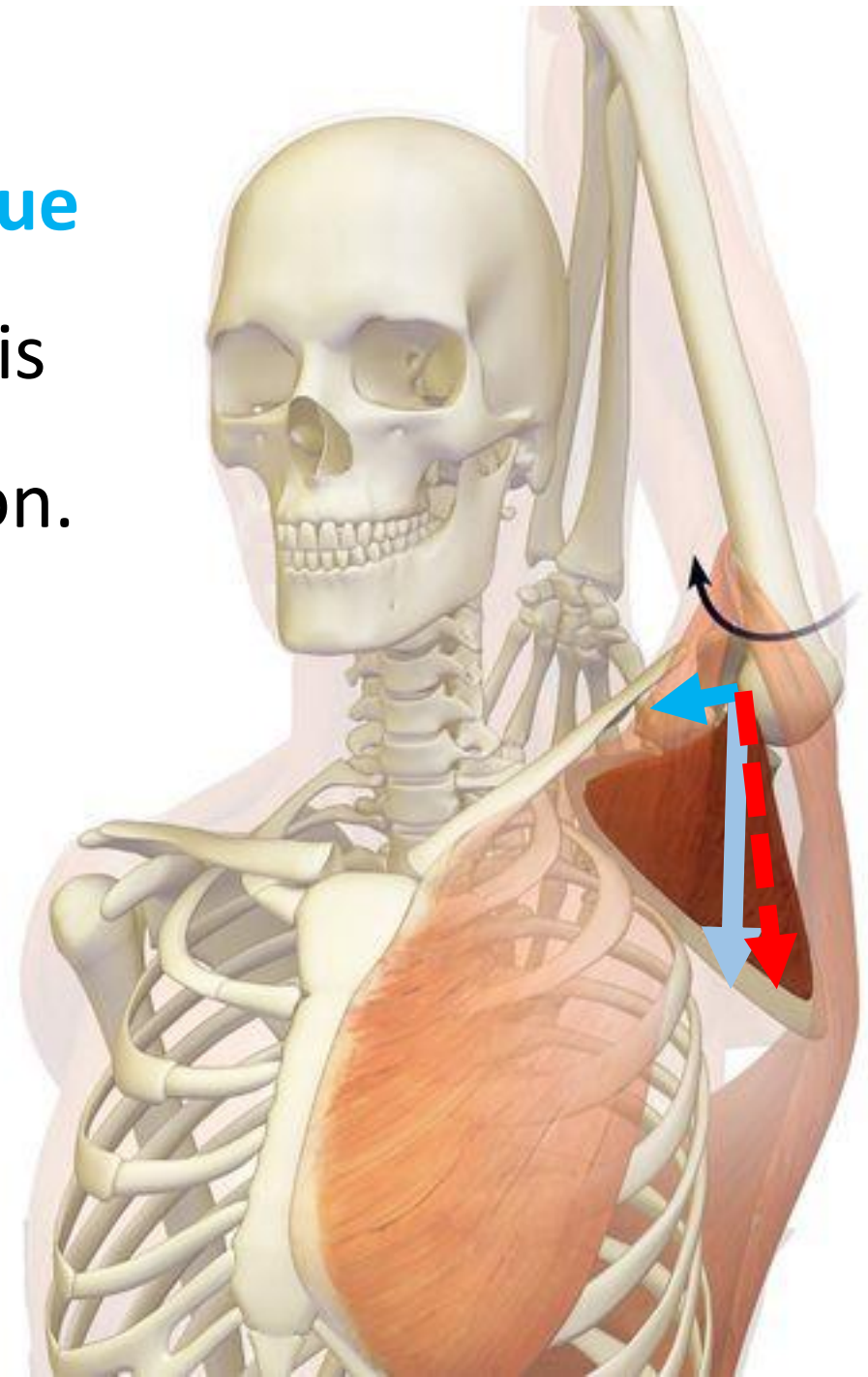
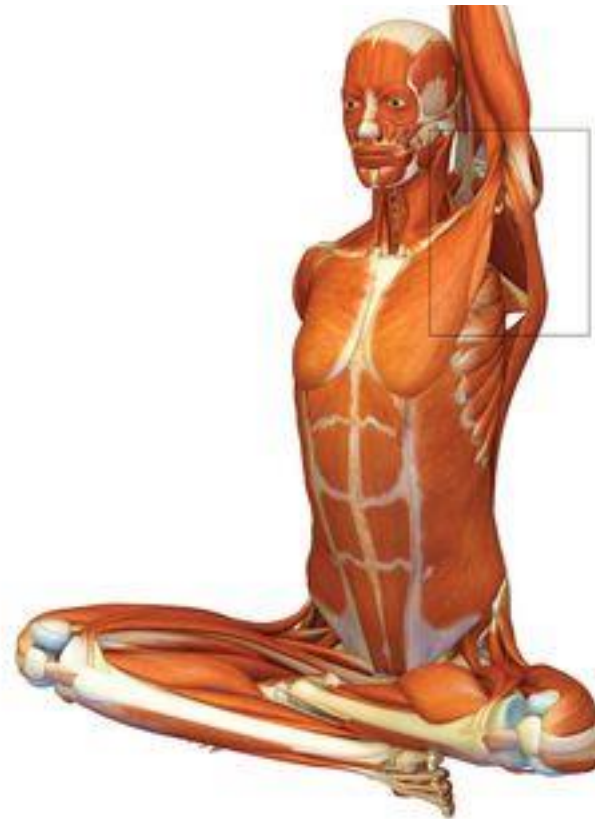


Close to 90° of abduction subscapularis **torque** remains higher than its **compressor force** ( $F_x$ )



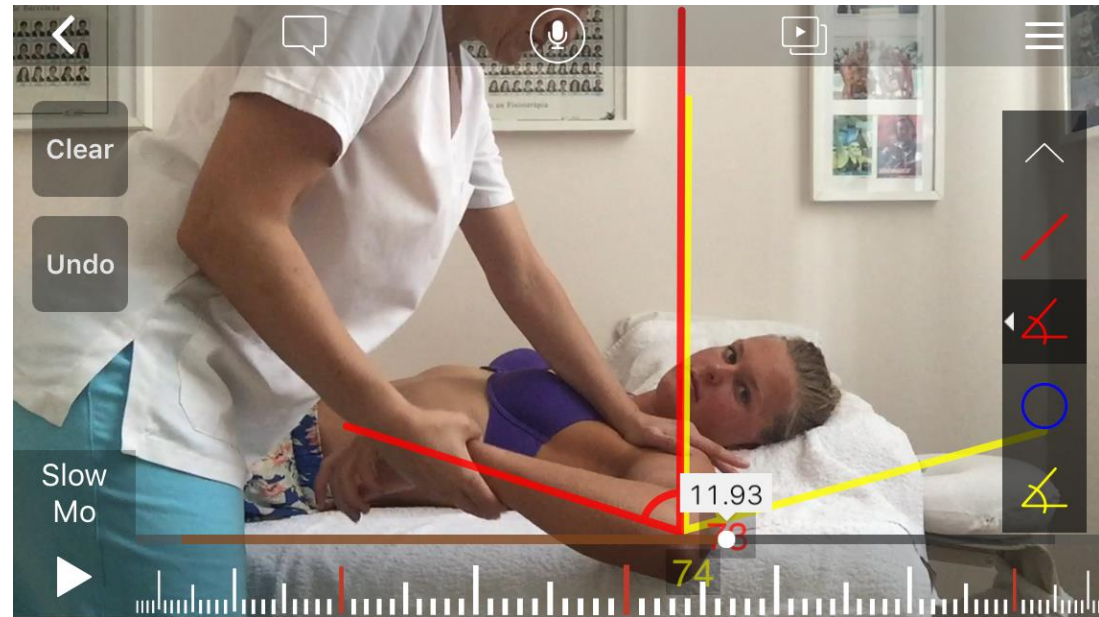
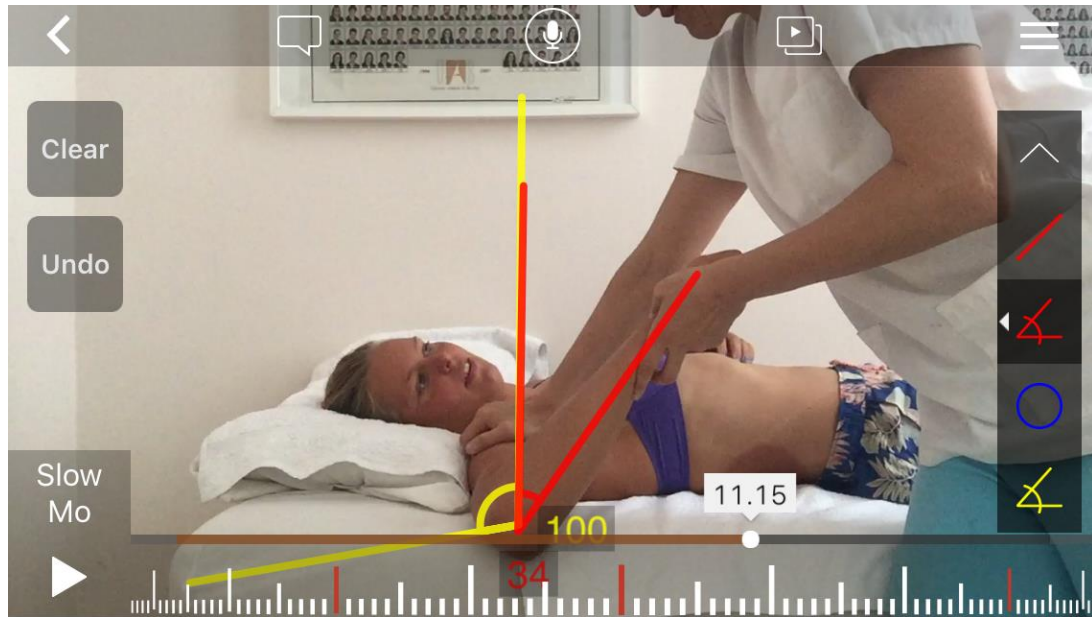


When subscapularis reduces its **torque** (during stretched position) its effort is increased to produce internal rotation.



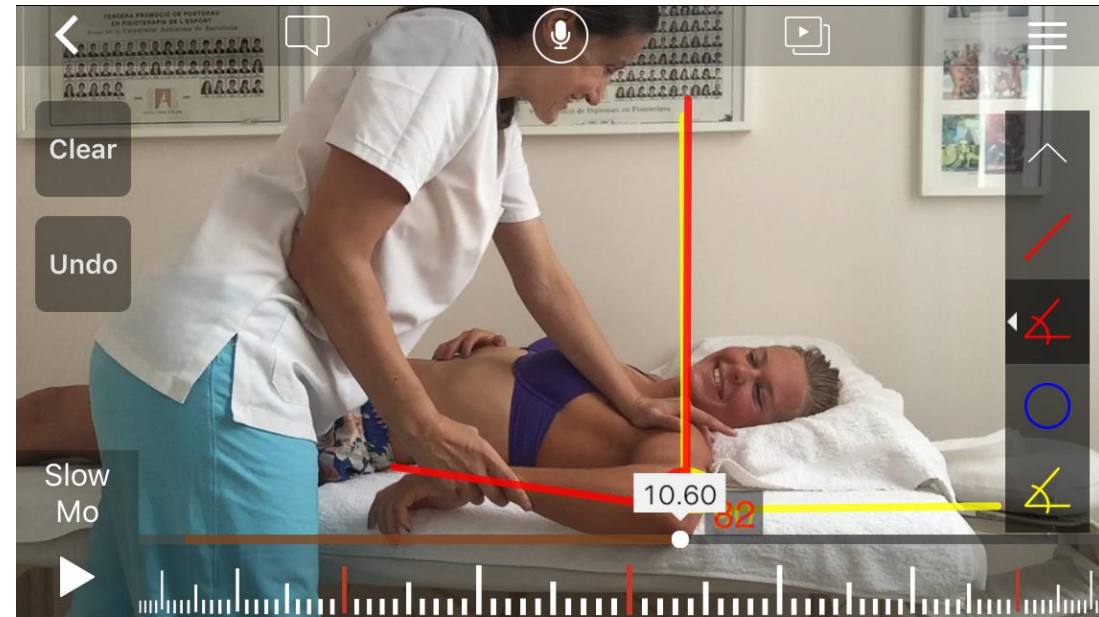
# Sharon Case Report:

## 1<sup>st</sup> session pre test



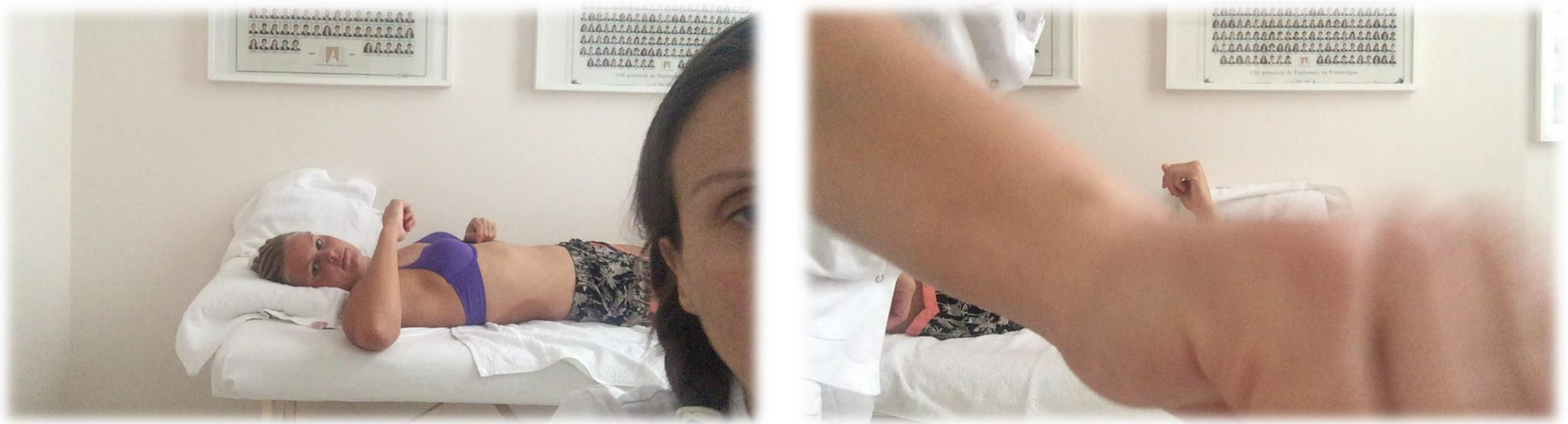
# Sharon Case Report

## 1<sup>st</sup> session post test.

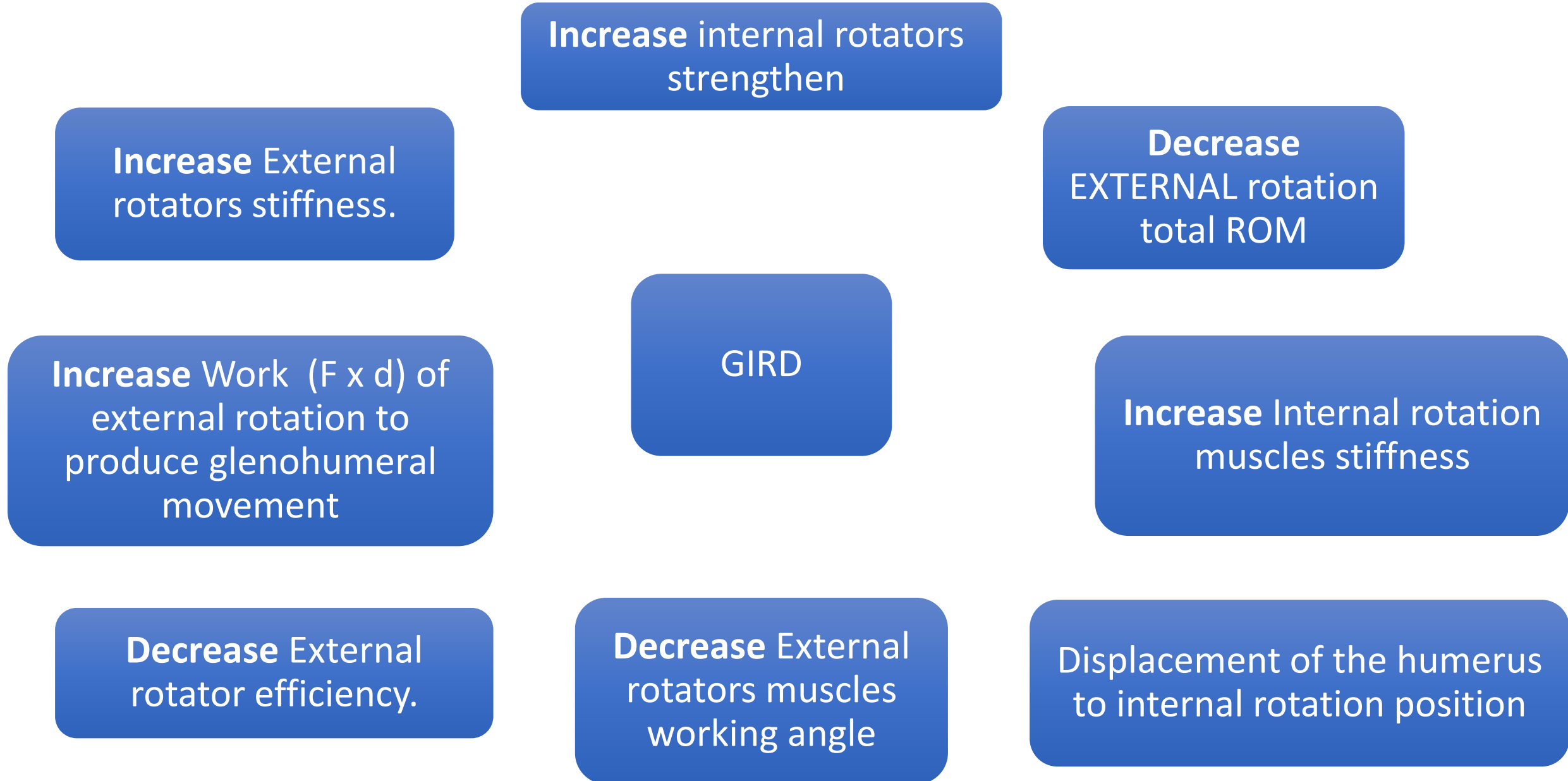




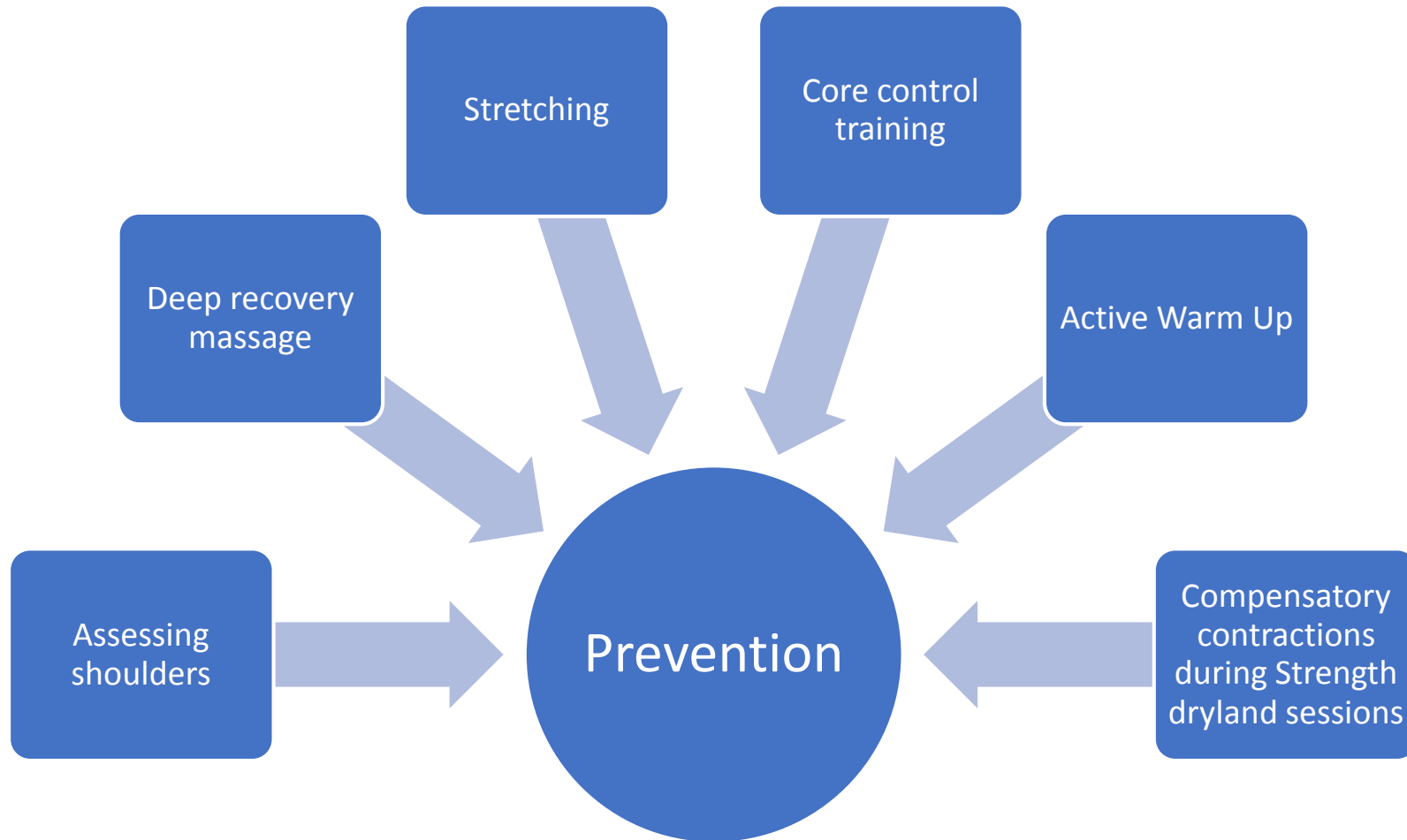
# 1<sup>st</sup> step: Assessing pathologic kinematics and glenohumeral internal rotation deficit (GIRD)



# GIRD ETHIOLOGY in swimmers Solana's Theory



# Non-invasive therapies to save the athletes from surgery.





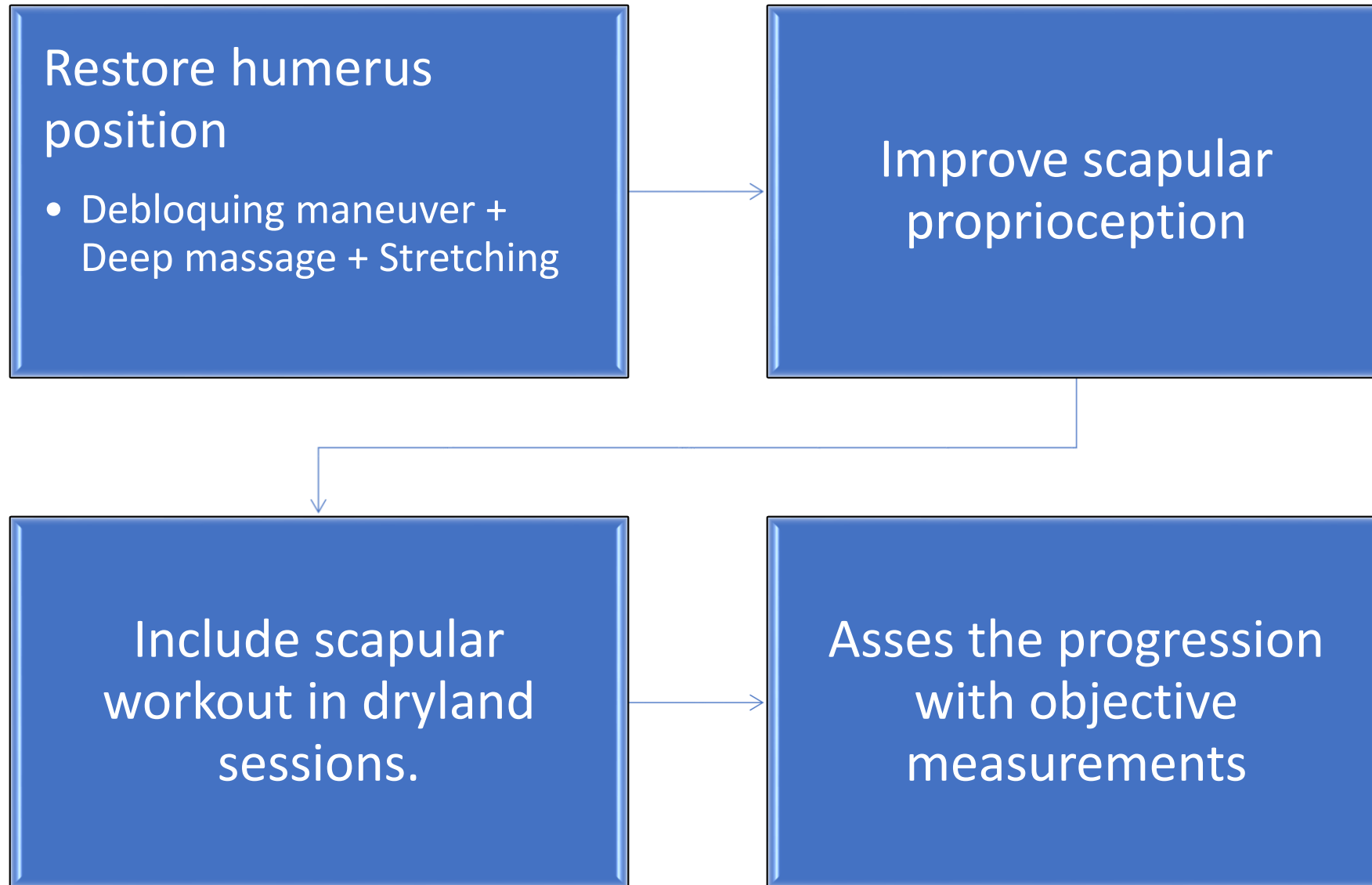
## Restore humerus position

- Debloquing maneuver + Deep massage + Stretching

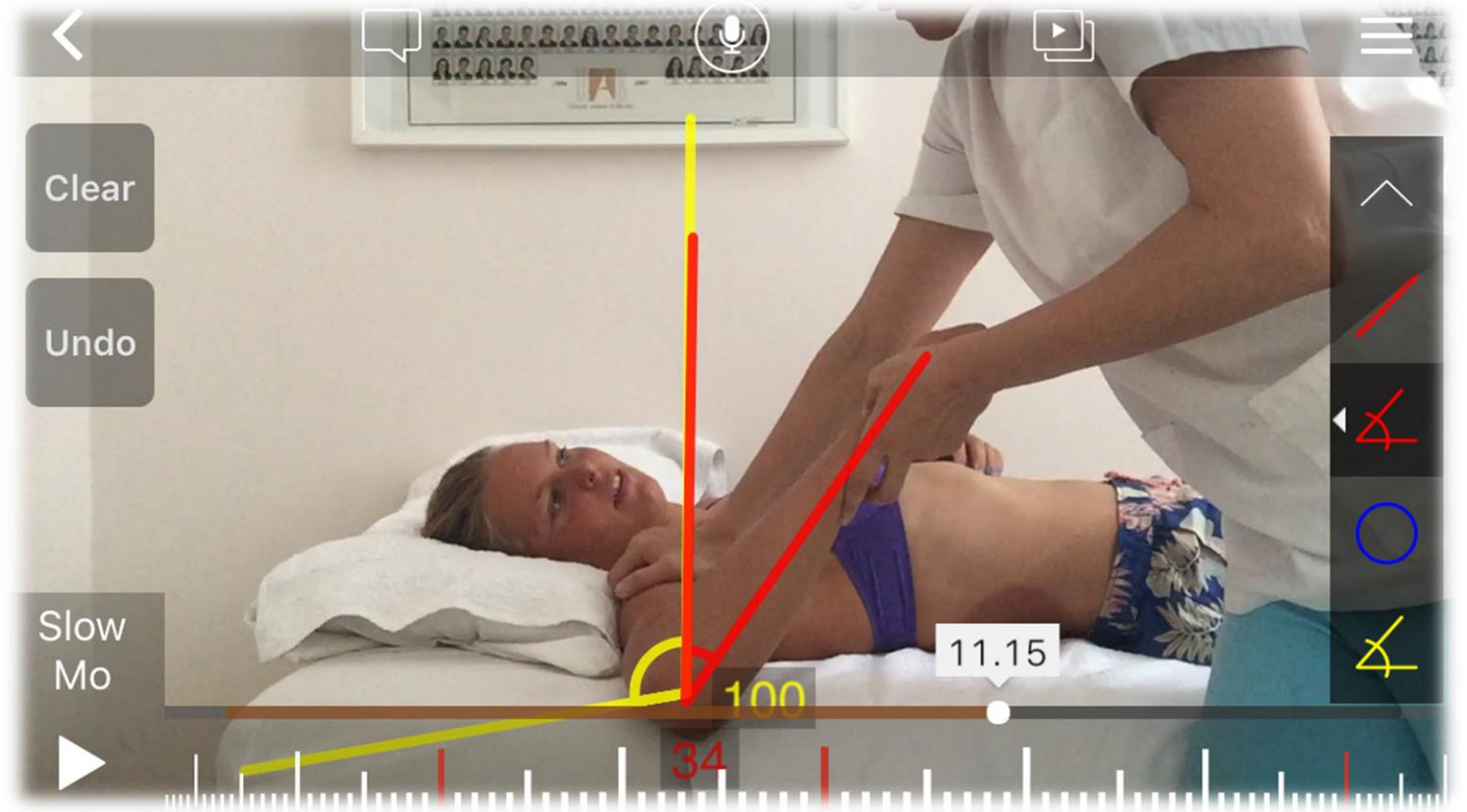
## Improve scapular proprioception

Include scapular workout in dryland sessions.

Asses the progression with objective measurements

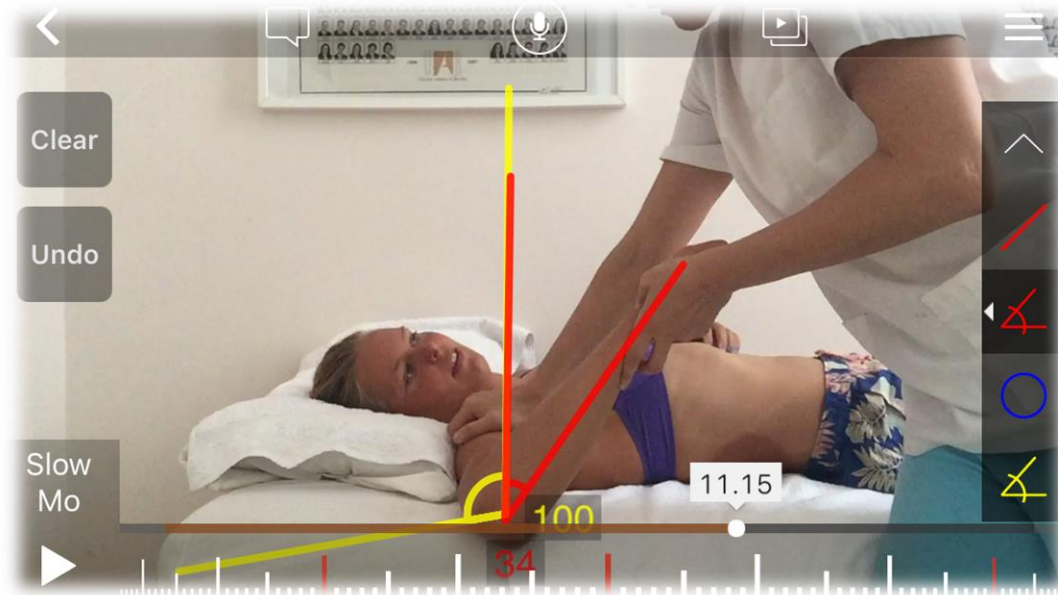


Assessing shoulder GIRD and TAMD status to adapt the prevention exercises to each swimmer



# Effects of “Deblocking the glenohumeral joint”

Injured athlete Before  $34^{\circ}$



Injured athlete After  $77^{\circ}$  (+ $43^{\circ}$ )



# Deep massage of both internal and external glenohumeral rotators **including the anterior fascia muscles**



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# Programing prevention exercises

- Determine which are the main muscles to include in the exercise program.
- Knowing different exercise prevention programs (adapted to each shoulder problem or injury)
- How to use new equipment for prevention exercise programs

# Studying the specific athlete biomechanics

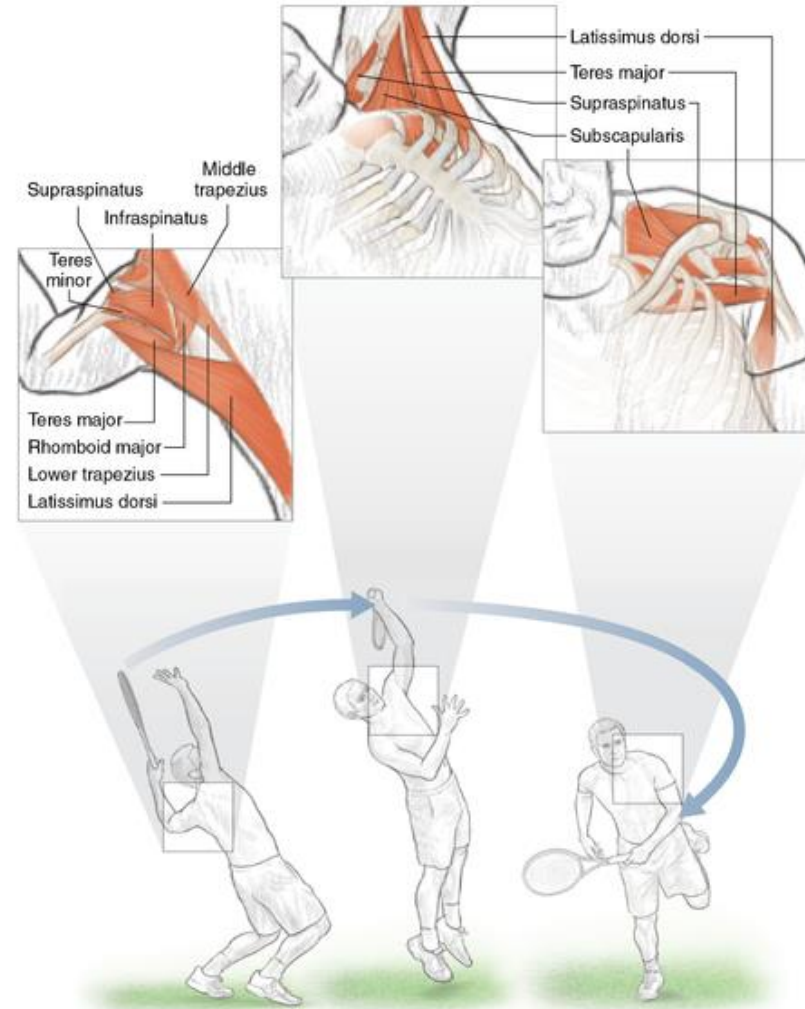
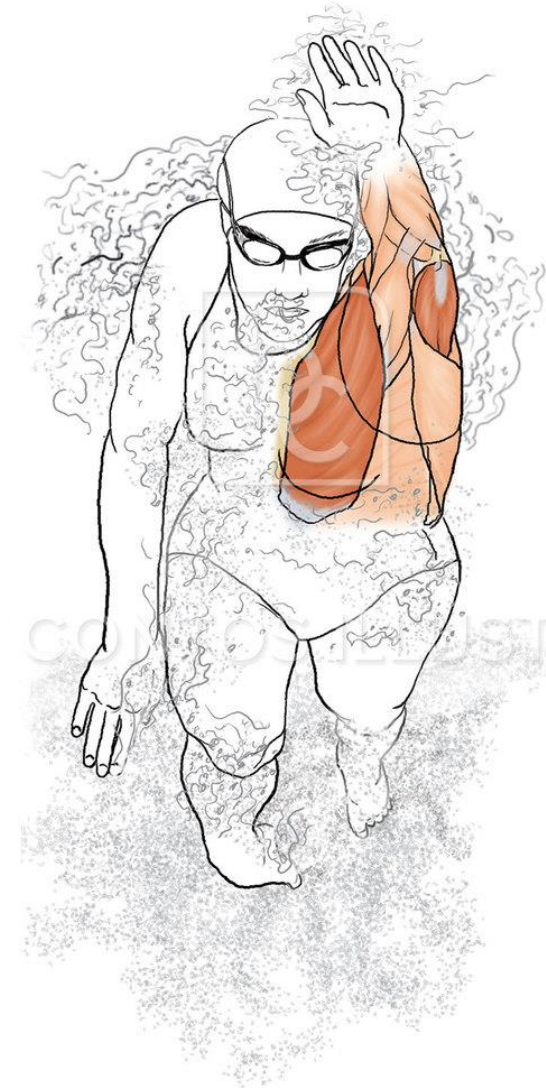


Figure 2.3 Changes in the humeral head during the serve.



# Knowing different exercise prevention programs (adapted to each shoulder problem or injury)

## Programa de prevención de lesiones para hombros inestables



### Objetivos:

1. Fortalecer los músculos aproximadores de la escápula para posteriorizar el húmero.
2. Mejorar el control motor de la musculatura escapular.
3. Mejorar el tono muscular de los músculos coaptadores escapulares (deltoides principalmente)

### Consideraciones generales:

Realizar cada día antes de la primera sesión de agua i seco.

1-2 series de 15-20 repeticiones / máximo 15" de descanso entre series y/o ejercicios.

¡Es imprescindible **no coger la banda elástica con la mano cerrada!** La mano debe estar abierta con los dedos extendidos.

### Ejercicio 1:

Coberturas en diagonal de 3-10 alturas diferentes, el gesto termina aproximando las escápulas. Cada movimiento es una repetición.



### Ejercicio 2:

Aproximación escapular con en posición horizontal. Sin flexionar el codo debe estirarse el elástico aproximando la escápula al cuerpo.



### Ejercicio 3

Remo a varias alturas de los codos. Con los dos brazos a la vez remar a 3 alturas diferentes, terminando el gesto con la aproximación máxima de las escápulas.



### Ejercicio 4

Puente lateral empujando el suelo con la mano y el codo extendido. Cada empuje cuenta como una repetición.



### Ejercicio 5 y 6

Puente empujando el suelo (boca arriba y boca abajo) con la mano y el codo extendido. Cada empuje cuenta como una repetición.



## Strength Prevention Program

Before training or racing once a day.

Perform the exercises at breathing pace keeping your attention in contact the scapulas and contract the Core in each movement and EXCHEL the air at time.

### How to hold the elastic band:



### 1. Attach the scapula one side or both sides at time (recommended)



From your elbow in extension attach the scapula to your thorax while exhale the air and contract the core.  
1 set x 20 reps each side

### 2. Rowing at 3 highs (each 3 is one repetition) one side or both sides at time (recommended)



From the starting position attach the scapulas while exhale the air and row at 3 highs  
1 set x 15



### 3. The Bird at 10 positions (each position is one repetition)



From the starting position attach the scapulas while exhale the air and elebate your arm from the floor at 10 positions  
4 set x 10 reps

# What did you do until that moment?

FARNETANI dott. EMILIANO fisioterapista  
VAN ROUWENDAAL SHARON  
SHOULDER RIEDUCATION  
Durata totale 00h00'00"  
20 mag

ASSOCIAZIONE ITALIANA FISIOTERAPIA

N. 9 muscoli stabilizzatori delle scapole 16

Note: In piedi con braccia ai fianchi. Gomiti flessi a 90° ed elastico impugnato a due mani. Avvicinare le scapole tra loro mettendo così in tensione l'elastico. Mantenere la posizione per 3-5 sec., ripetere 10 volte.

3x10x5"

N. 10 romboidi trapezio medio

Note: 1 - BRACCIA TESE; 2 - GOMITI FLESSI; 3 - GOMITI FLESSI E BRACCIA ABDOTTE A 45°. In piedi con fronte rivolta ad un supporto dove verrà fissato l'elastico. L'elastico è impugnato a due mani e l'esercizio eseguito in 3 diverse modalità: BRACCIA TESE. Trazionare l'elastico verso di sé, raggiunta l'altezza dei fianchi, avvicinare le scapole tra loro.

N. 11 DELTOIDE POSTERIORE

Serie Rip Kg % Pausa TRip. 00:00 00:00

Note: In piedi fronte alla porta, gambe divaricate sagittalmente per una maggiore stabilità. Con il braccio teso, trazione l'elastico portandolo fino al fianco, ritornare lentamente alla posizione di partenza. Ripetere 10 volte. Dopo una breve pausa (individuale) eseguire altre 2 serie da 10.

4x15 SLOW

N. 12 ABBASSATORI: GRAN PETTORALE GRAN DORSALE

Note: In piedi fianco rivolto alla porta. Impugnare l'elastico con il braccio teso aperto lateralmente. Trazionare l'elastico abbassando il braccio fino al fianco. Ritornare alla posizione di partenza con elastico sempre in leggera tensione. Ripetere 10 volte. Dopo una breve pausa eseguire altre 2 serie da 10.

4x15 SLOW

N. 13 ABBASSATORI: GRAN DORSALE

Note: In piedi fianco rivolto alla porta. Impugnare l'elastico con il braccio teso aperto lateralmente. Trazionare l'elastico portando il braccio leggermente dietro la schiena. Ritornare lentamente alla posizione di partenza. Ripetere 10 volte. Dopo una breve pausa (individuale) eseguire altre 2 serie da 10.

4x15 SLOW

N. 14 ABBASSATORI: GRAN PETTORALE FASCI OBLIQUI

Serie Rip Kg % Pausa TRip. 00:00 00:00

Note: In piedi fianco rivolto alla porta. Impugnare l'elastico con il braccio teso aperto lateralmente. Trazionare l'elastico portando la mano leggermente davanti al corpo. Ritornare lentamente alla posizione di partenza. Ripetere 10 volte. Dopo una breve pausa (individuale) eseguire altre 2 serie da 10.

4x15 SLOW

N. 15 deltoide posteriore 2

Serie Rip Kg % Pausa TRip. 00:00 00:00

Note: In piedi busto inclinato avanti. Impugnare l'elastico con il gomito flesso. Trazionare l'elastico portando il gomito in alto dietro. Ritornare lentamente alla posizione di partenza. Ripetere 10 volte. Dopo una breve pausa (individuale) eseguire altre 2 serie da 10.

3x10x3"  
RSC 20"

N. 16 ROTATORI INTERNI

Note: Gomito flesso a 90° con incrocio tra il braccio ed il fianco, ruotare internamente il braccio portando la mano verso l'addome, ritornare lentamente alla posizione di partenza. Ripetere 10 volte. Dopo una breve pausa eseguire altre 2 serie da 10.

6x10x3" BTP 3"  
RSC 20"

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- Before chose the best exercises it's important to know what did the athlete before.
- Sessions, exercises, sets, repetitions, therapies, etc.



## Strength Prevention Program

Before training or racing once a day.

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How to hold the elastic band:



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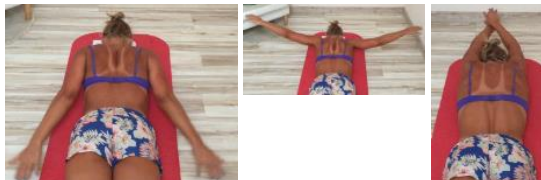
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From the stating position attach the scapulas while exhale the air and row at 3 highs  
1 set x 15



3. The Bird at 10 positions (each position is one repetition)

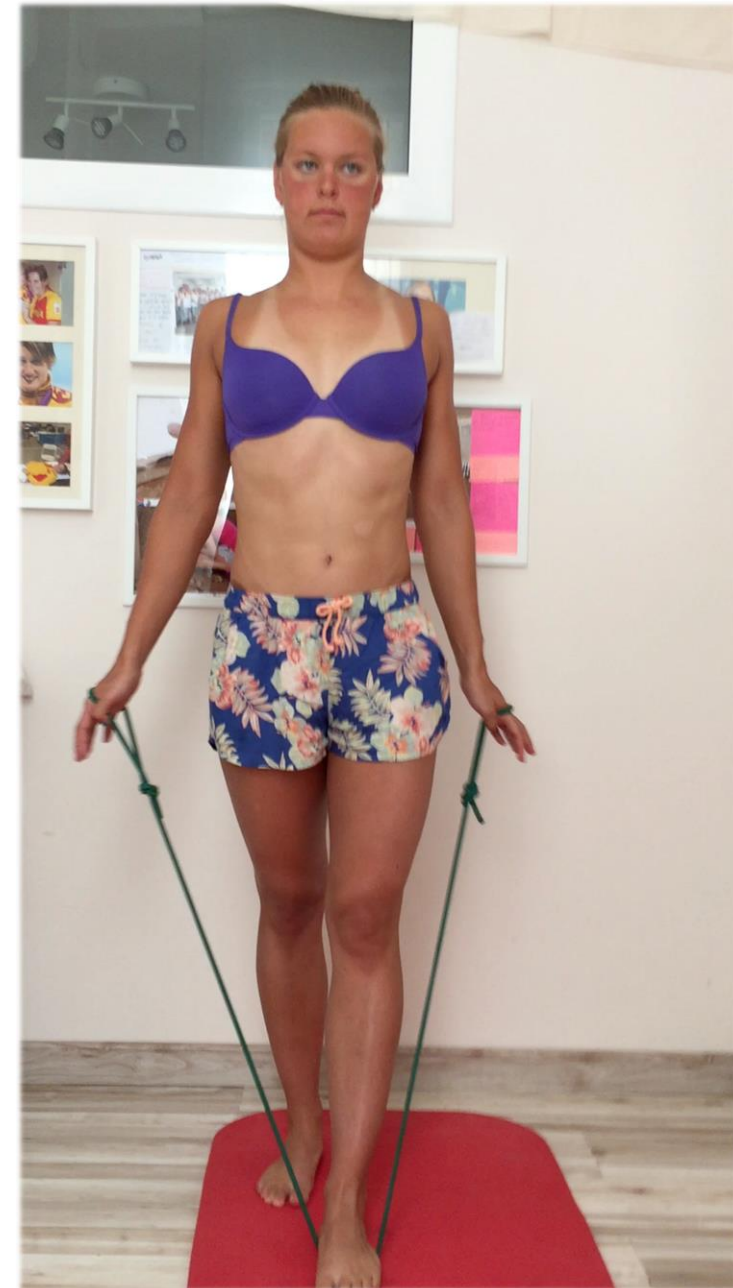


From the stating position attach the scapulas while exhale the air and elebate your arm from the floor at 10 positions  
4 set x 10 reps



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# Exercises focused on scapular control, endurance strength & Core control





# Exercises focused on scapular control, endurance strength & Core control

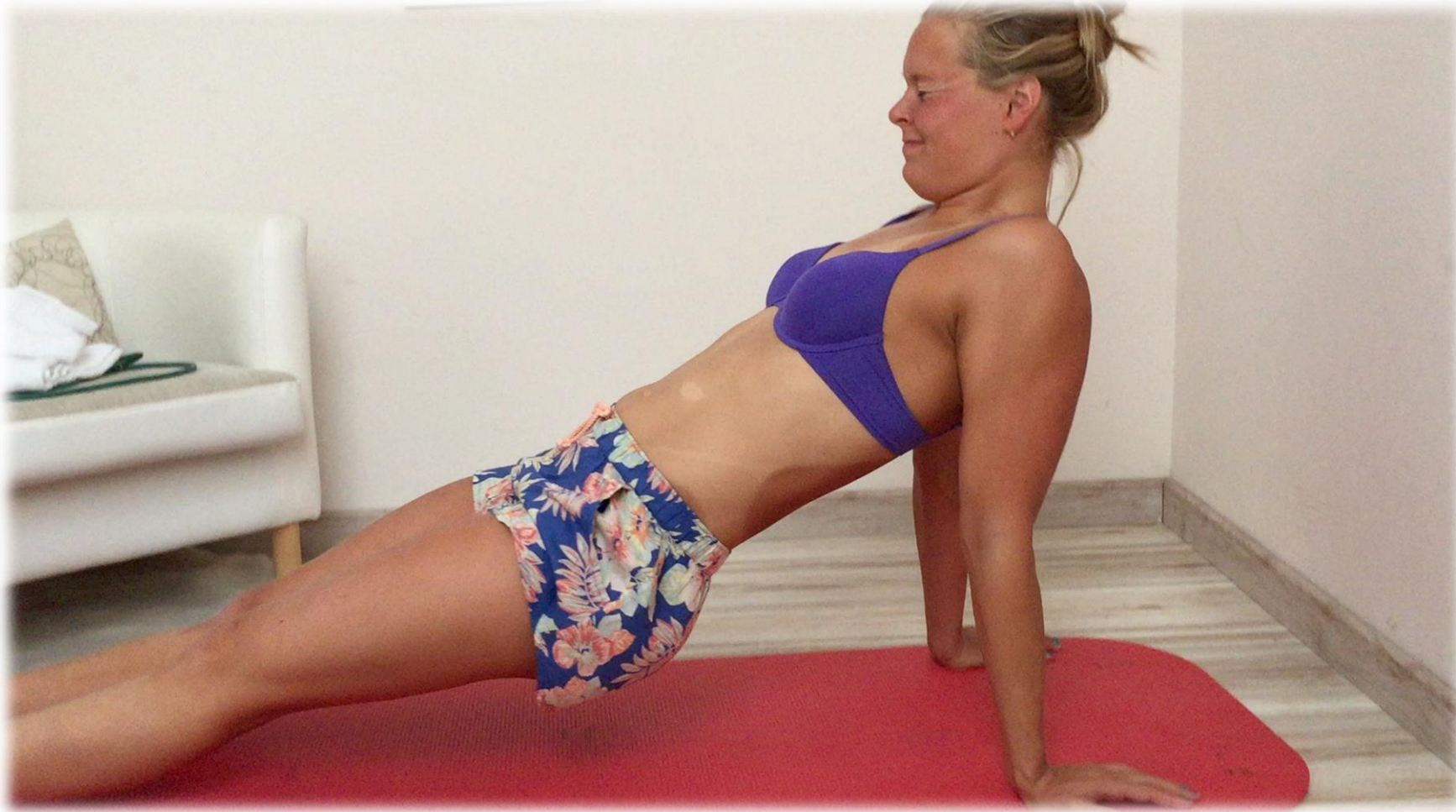


# Exercises focused on scapular control, endurance strength & Core control



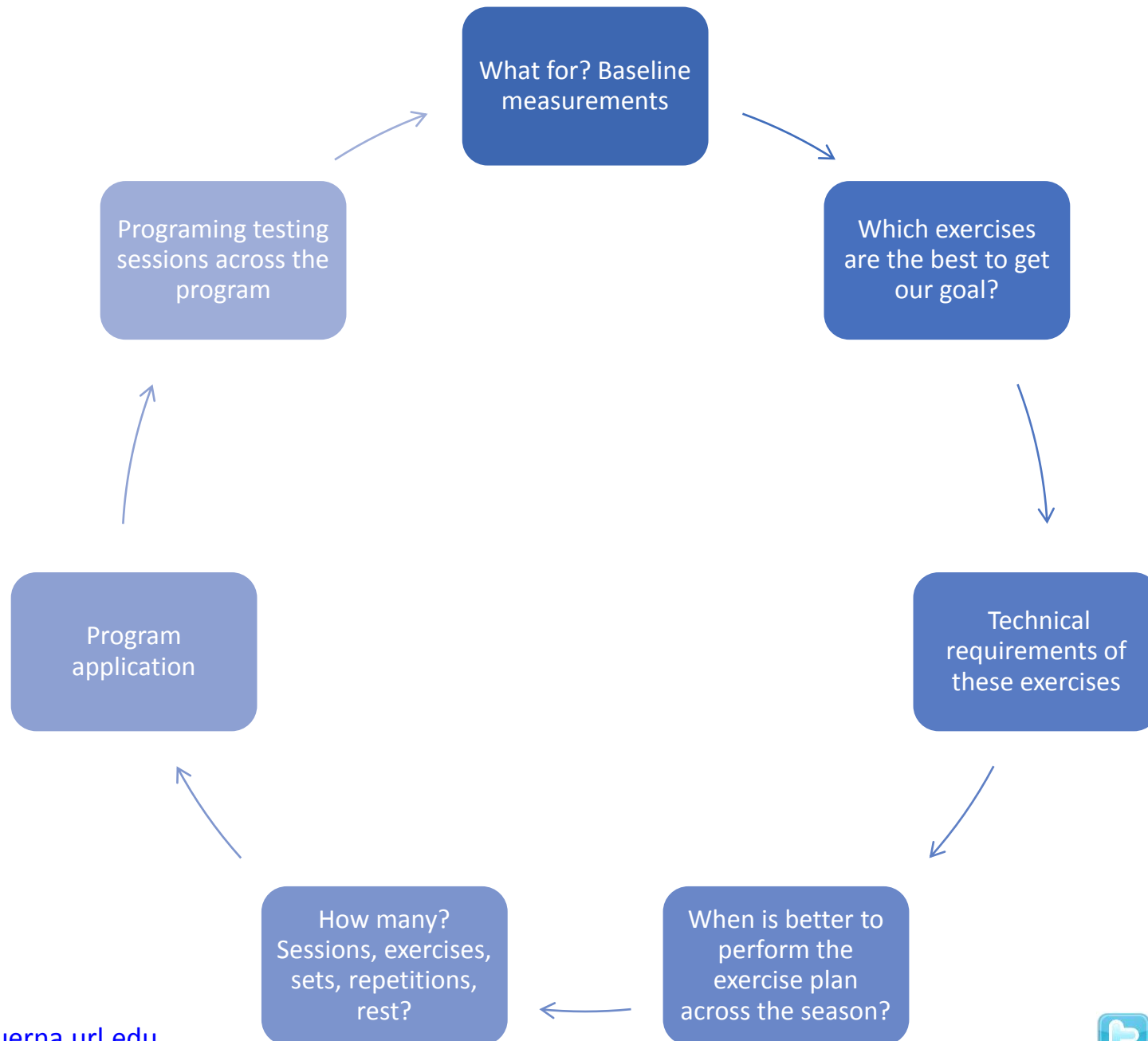


# Exercises focused on scapular control, endurance strength & Core control



# Exercises focused on scapular control, endurance strength & Core control







It's important to explain physiological importance of the stretching to the swimmers to make them understand why it's important to stretch







## Messages to take home

- ✓ It's necessary to “refresh” the basic biomechanics applied to the specific sport.
  - ✓ Each athlete is different.
- ✓ Common protocols are not suitable for elite athletes.

## Messages to take home

- ✓ Don't forget the basis: To **restore homeostasis** can be achieved with many techniques and each professional must use the one that confers **confidence and clinical results.**

# Messages to take home

- ✓ Combine methods is the best option

**Unlock technique + Deep Massage + Stretching +  
Exercise program**



# Messages to take home

- ✓ Objective assessment to follow the real (not subjective) progression.



# Messages to take home

✓ **All professionals around the athletes are  
have the same importance** to their success.

Don't forget to ask for help when it's  
necessary.





# Team Mireia Belmonte





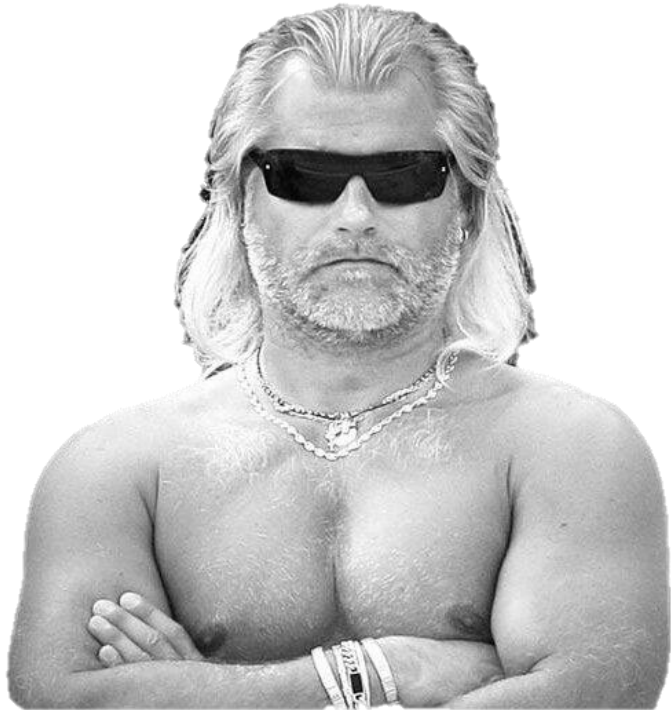
# Team Sharon van Rowendaal





# Messages to take home

- ✓ Once the elite athlete returned to play, our success it's **to allow their train as hard as possible without being injured.**





*"Our gold is their succes"*  
Thanks for your  
attention



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# Do you want more?



3-days Shoulder Masterclass  
Methods and strategies for shoulder assessment,  
therapy and exercises management

Next 7,8 & 9 april 2018 Laren, NL.

KNGF Accreditation: 20 points for 3 registers

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