

# *Science in Sport - Rehabilitation*

*Presentation and workshop*

Lutz Meissner, Fulda/Germany  
PT, Sport-PT (DOSB), Medical Cotrainer  
(ZVK),  
Athletic Coach, GP, IAAF Senior Lecturer

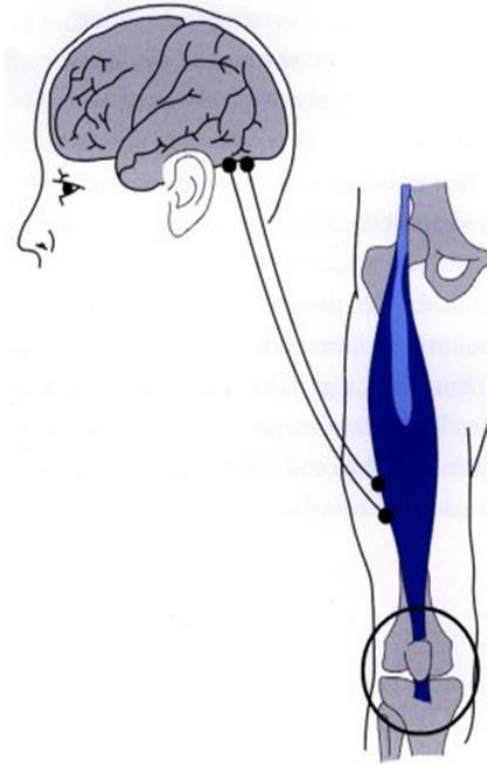
# When is Rehabilitation starting?

## After training or competition!

Lutz Meissner, Fulda/Germany

PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer

### The Arthron



„The smallest functioncircle“

Lutz Meissner, Fulda/Germany

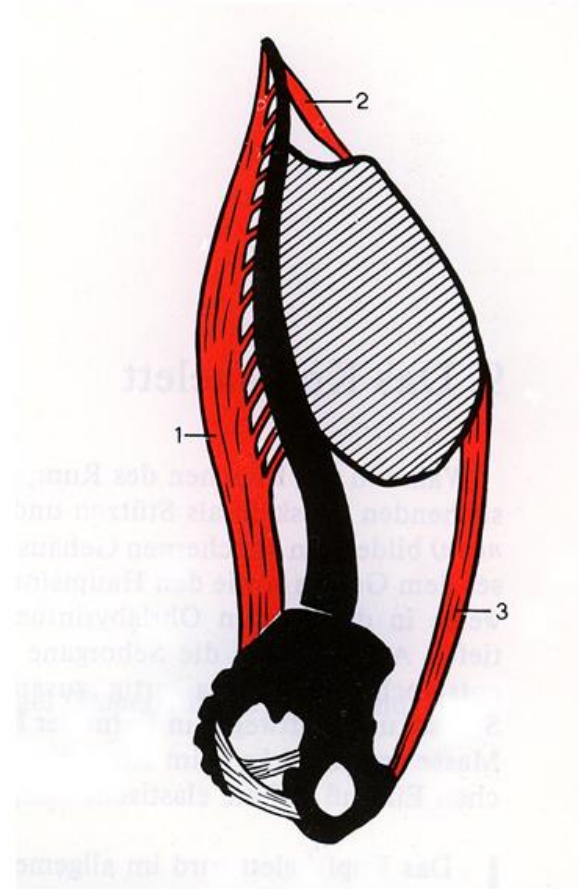
PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer

**The brain knows  
a lot about  
motion – less  
about muscles!**

Lutz Meissner, Fulda/Germany

PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer

## Muscle balance

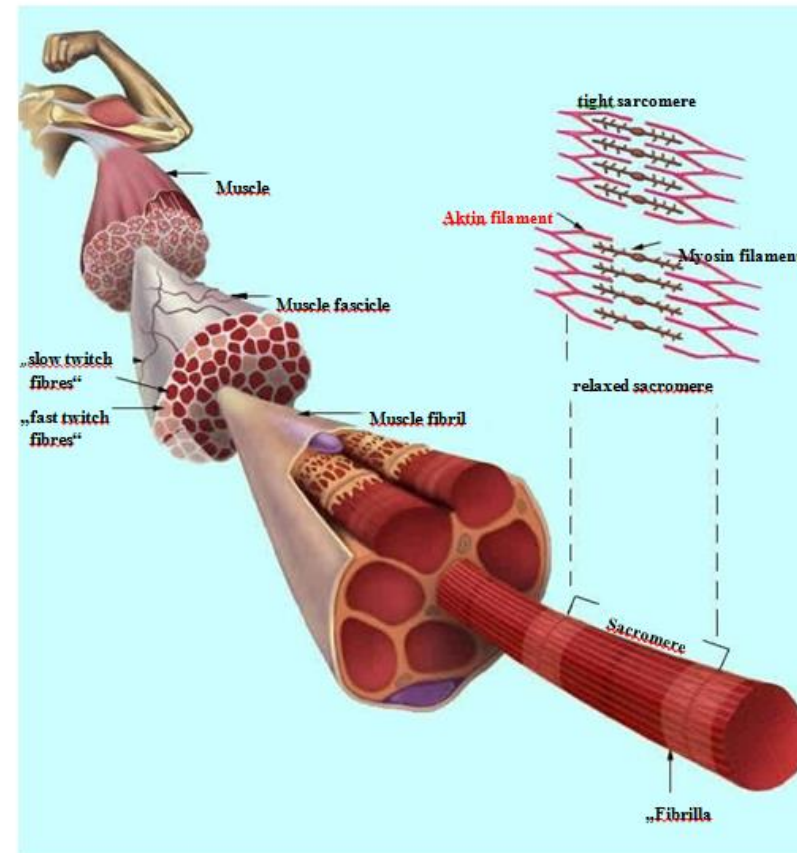


Lutz Meissner, Fulda/Germany

PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer



## The Muscle

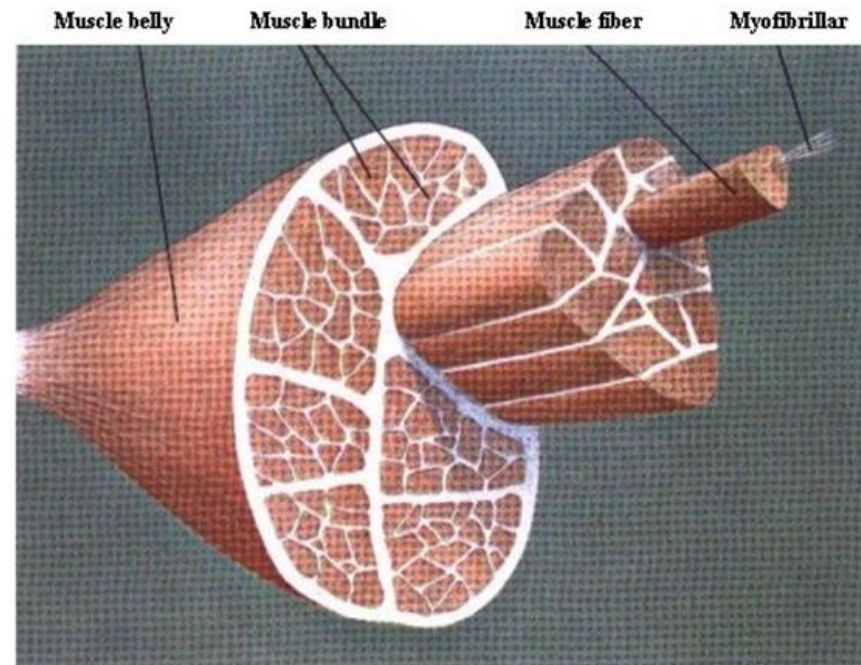


The muscles are also working in three-dimensions.

Lutz Meissner, Fulda/Germany

PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer

## The muscles

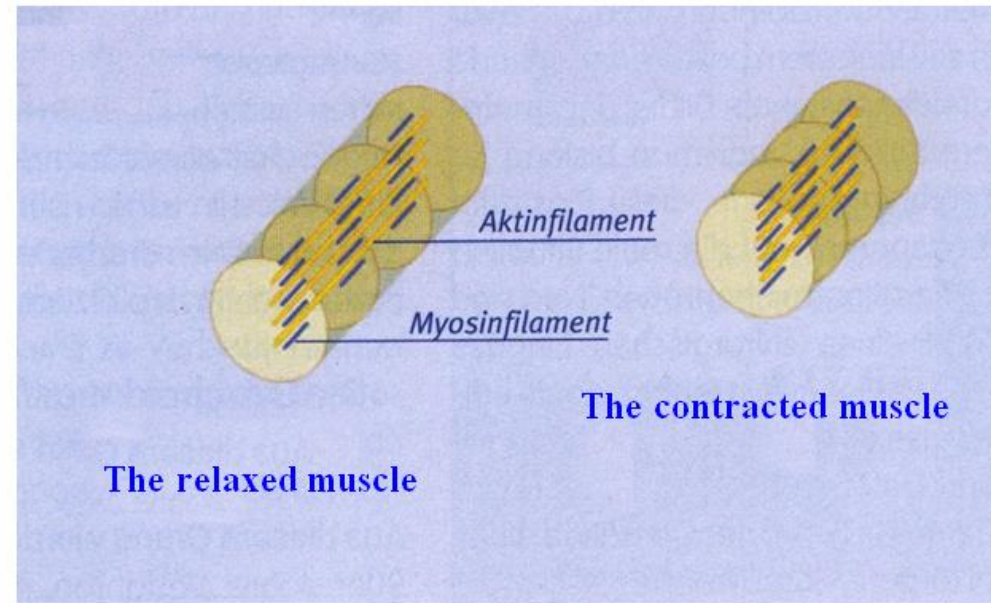


**The muscles have parts of mobilisation and stabilisation**

Lutz Meissner, Fulda/Germany

PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer

## The musculature work

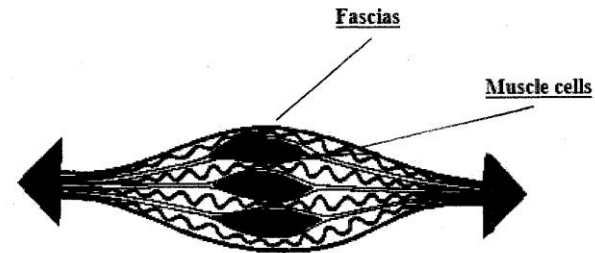


**The small parts of the muscles are also working in three-dimensions.**

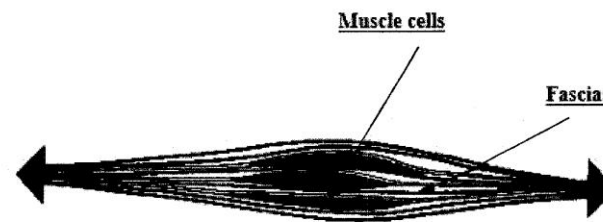


## The musculature work

### The contracted muscle



### The relaxed muscle



**Why not stretching a muscle when he is in contraction?**

# Sport Injuries in Track & Field

## Acute Intervention

Lutz Meissner, Fulda/Germany

PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer

**R est**

**I mmobilization (ICE)**

**C ompression**

**E levation**

### Cryo therapy / Cooling therapy

Ice-Massage local	$\pm 0^{\circ}\text{C} \rightarrow +4^{\circ}\text{C}$	5 – 20 sec. interval
Cold water local	$\sim + 10^{\circ}\text{C} \rightarrow 15^{\circ}\text{C}$	2 – 10 min.
Ice water local	$\pm 0^{\circ}\text{C} \rightarrow +4^{\circ}\text{C}$	1 – 60 min.
Cryo gel local from	$- 12^{\circ}\text{C} \rightarrow +12^{\circ}\text{C}$	1 – 30 min.

#### Pre Cooling

Improvement of Springiness / Elasticity (Sprint)

5% - 7%

- Ice bath, Ice massage, Fluid

#### Intermittent cooling

to relax by muscle stiffness or cramp - Ice massage, Fluid

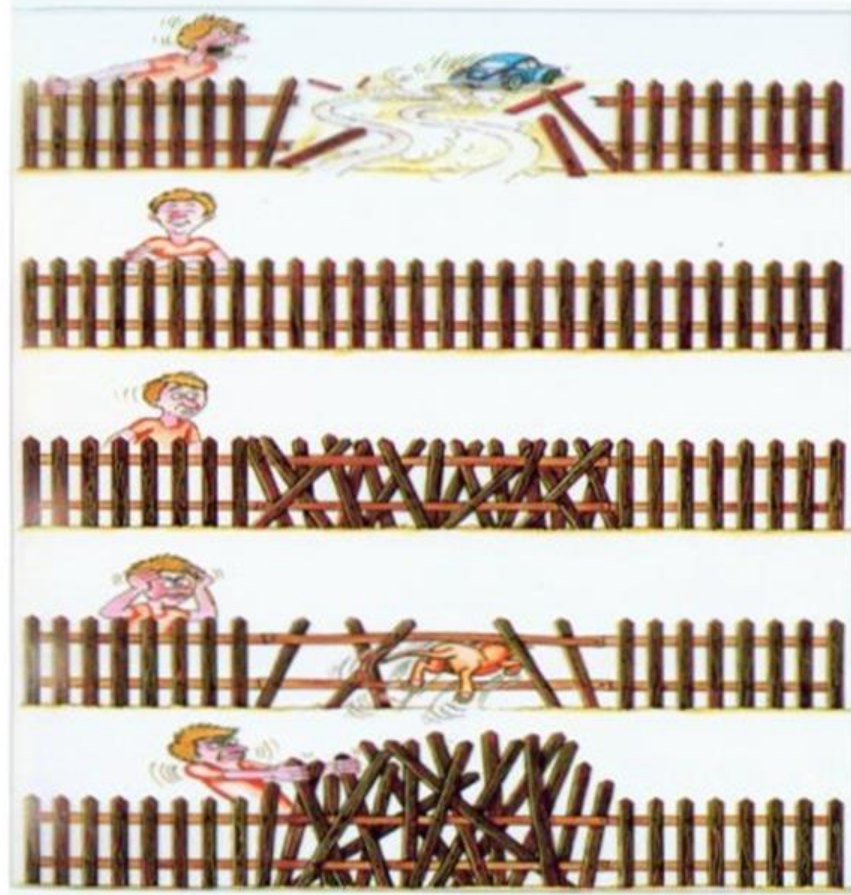
#### Post cooling

better regeneration by 30% - 40 %

- Ice bath and -massage  
with Fluid



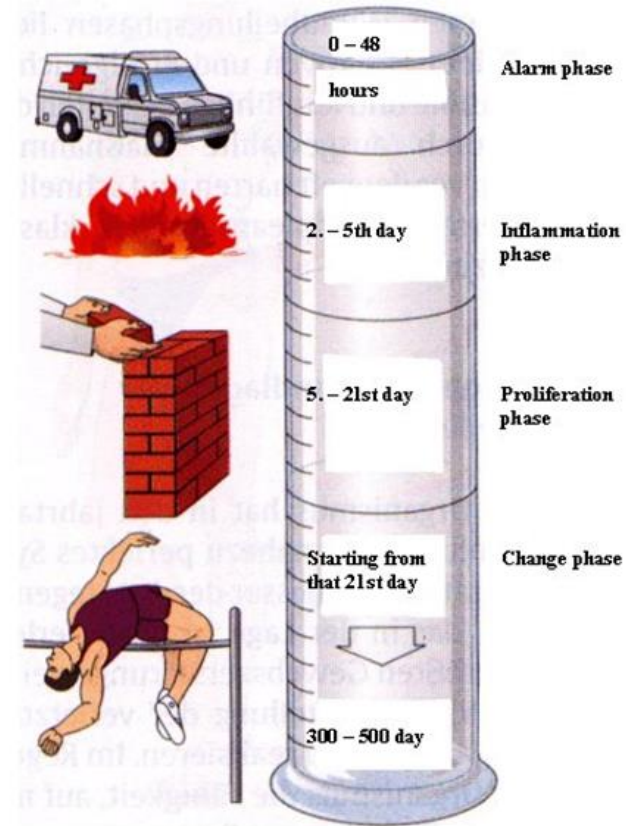
## Wound healing



Lutz Meissner, Fulda/Germany

PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer

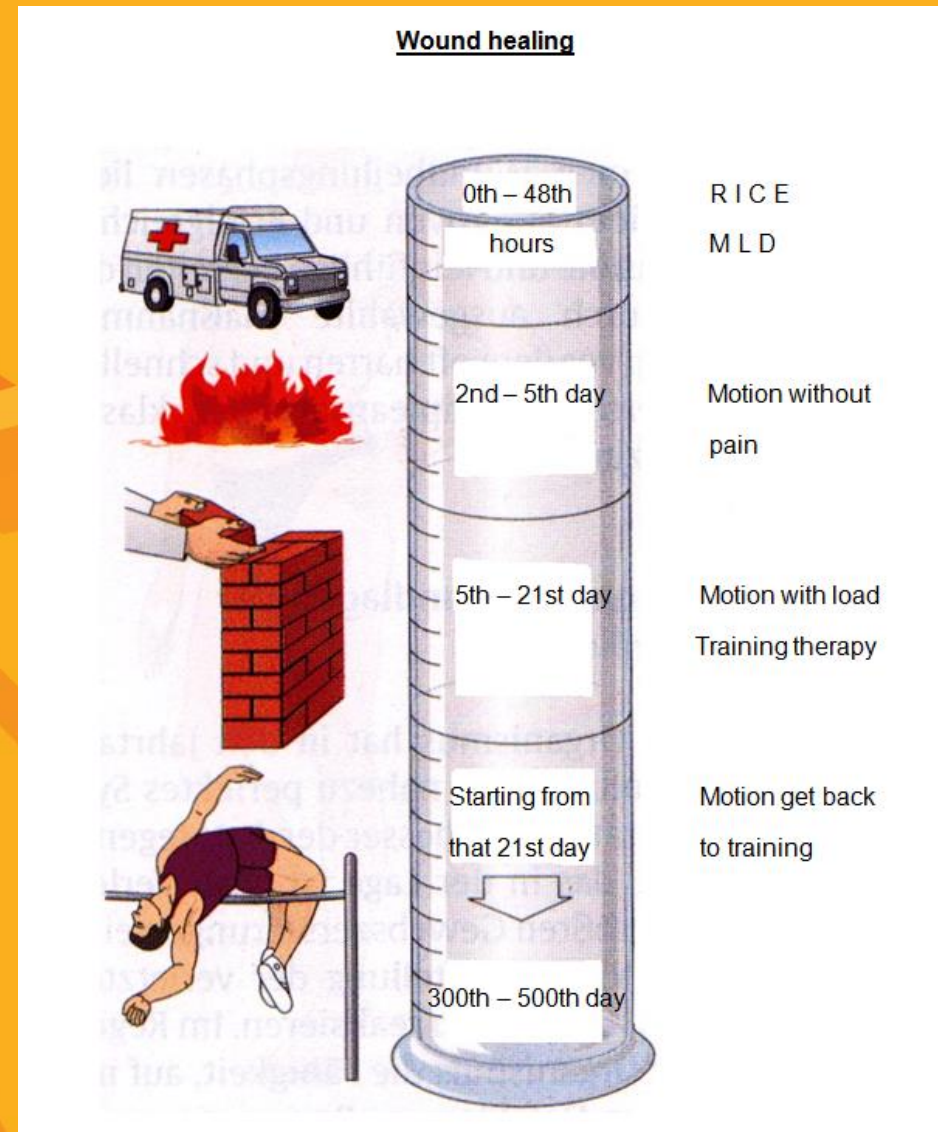
### Wound healing



**There is an inflammation without healing –  
but no healing without inflammation**

Lutz Meissner, Fulda/Germany

PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer



Lutz Meissner, Fulda/Germany

PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer

## Acute Intervention – how to manage

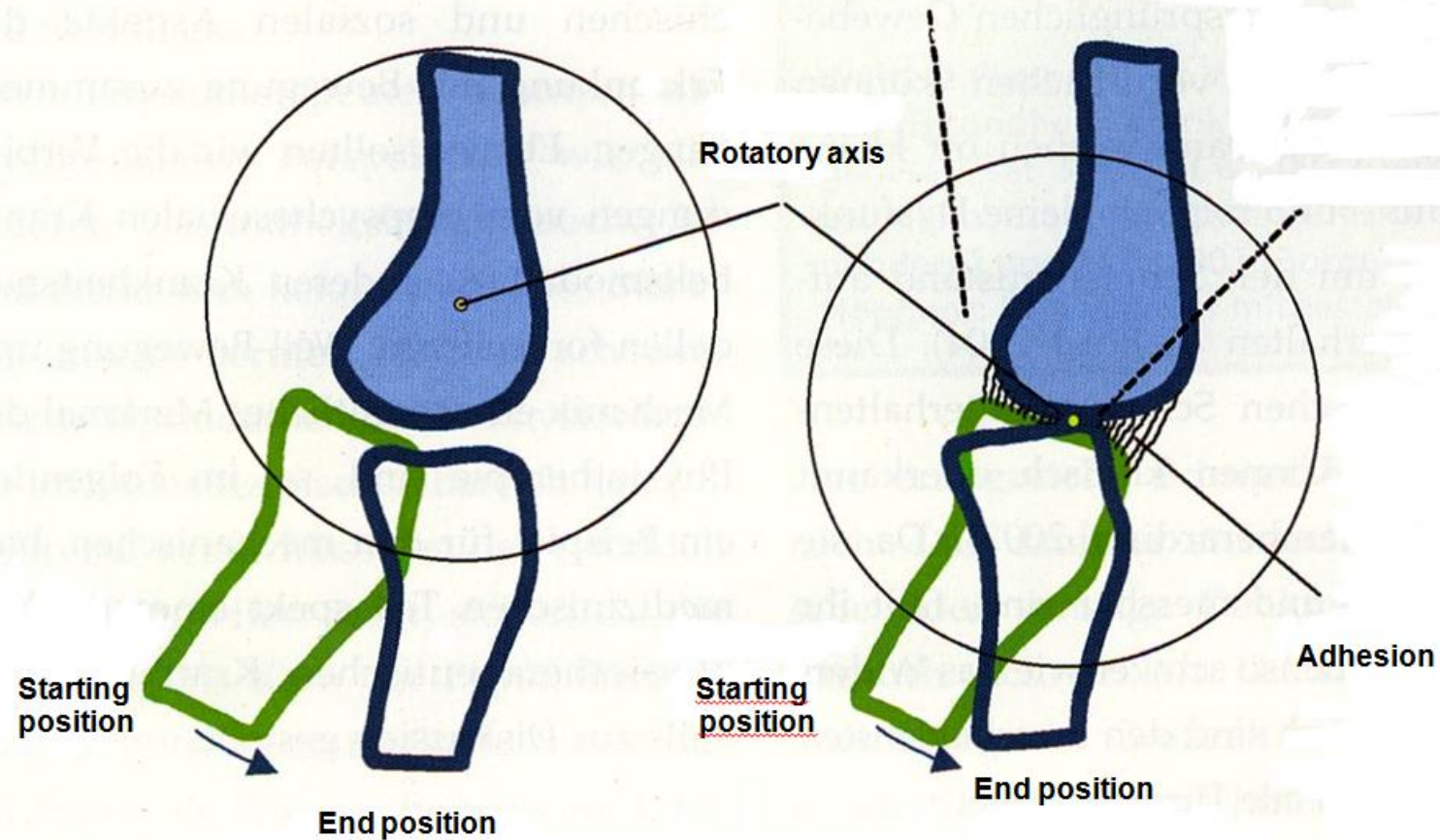
For muscles – RICE

For articulations – RICE

Osscilitation with mini traction  
and gliding to release pain for  
the joint capsule



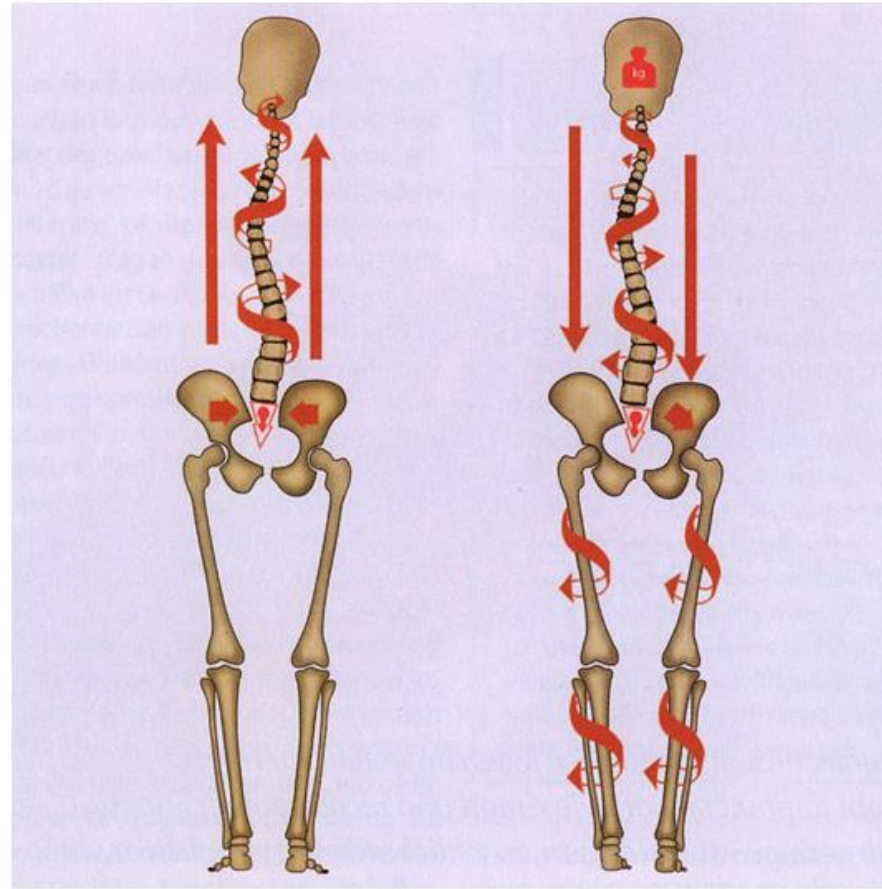
## Positional fault



Lutz Meissner, Fulda/Germany

PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer

### Rotation instability



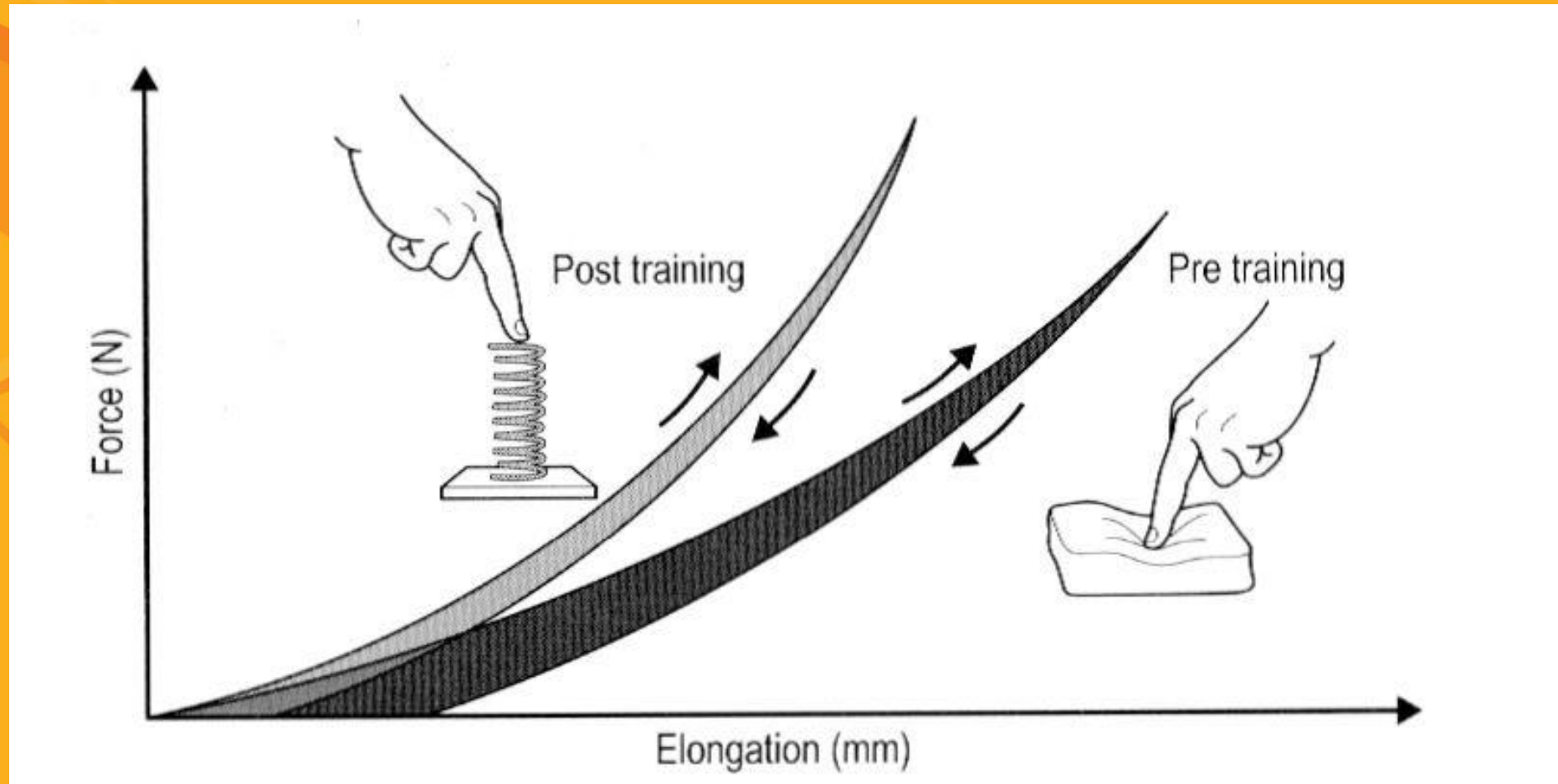
Lutz Meissner, Fulda/Germany

PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer

**„Everything  
you know  
about muscles  
is wrong“**

Lutz Meissner, Fulda/Germany

PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer

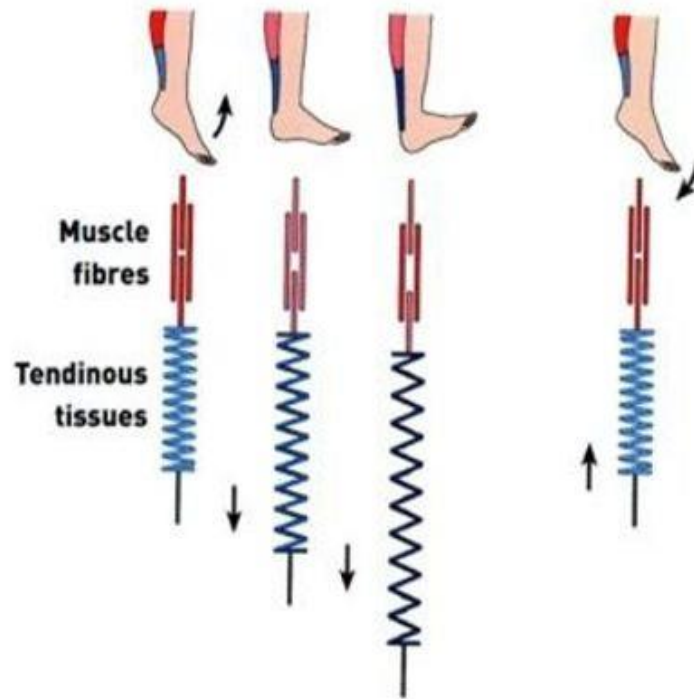


Lutz Meissner, Fulda/Germany

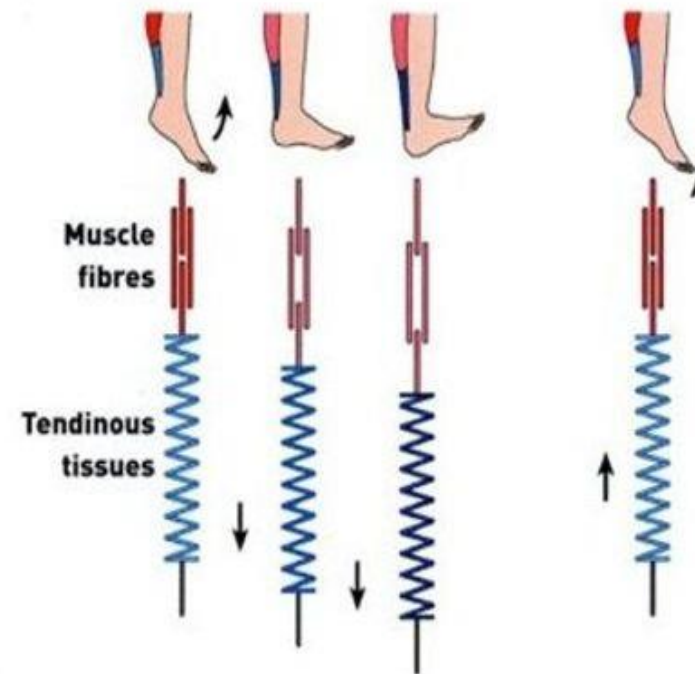
PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer



## Myofascial work



**Elastic training by jumps = Fascias training**

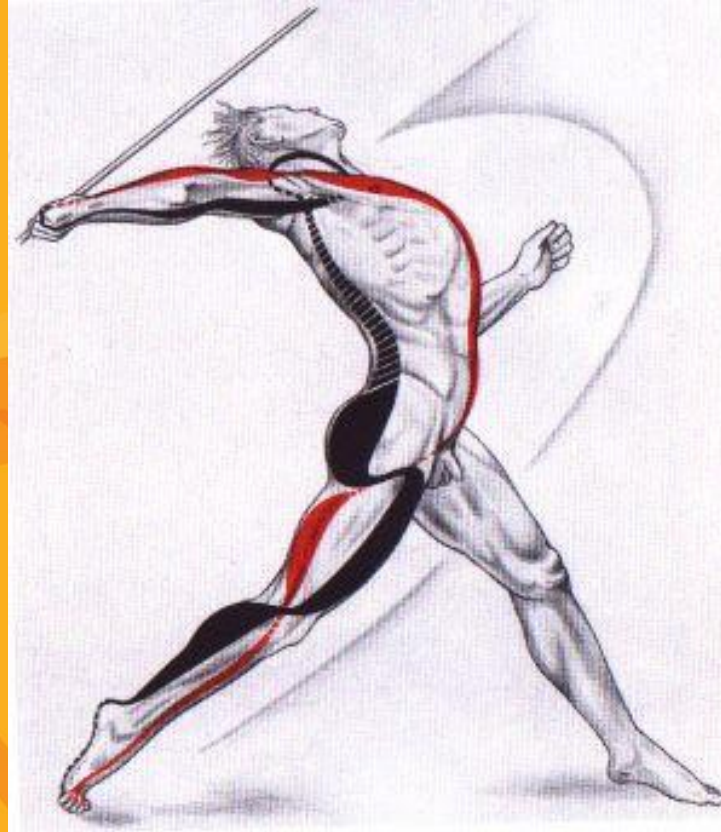


**Classical (conventional) strength training**

The fascias  
alone can  
do nothing

Lutz Meissner, Fulda/Germany

PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer



## **Muscle work is „Hold and Motion“**

Lutz Meissner, Fulda/Germany

PT, Sport-PT (DOSB), Medical Co-Trainer (ZVK), Athletic coach, GP, IAAF Senior Lecturer

## **Warm up – cool down**

**The cardio vascular system**

**Muscle and tendons**

**Articulation and ligaments**



# **Stretching**

**Functional for different sports**

**Before and after training or competition**

**Stretching for Muscle lengthening**



**open system**

**open system / sitting**

**Disadvantage:**

Training usually only with  
one muscle



**closed system**

**closed system / standing**

**Advantage:**

Training usually in muscle  
chains

## Summary

### Ten steps for “Muscle Coaching”

- 1) Do not stretch injured muscles (only Therapists).
- 2) You can only stretch “relaxed” muscles.
- 3) Try to relax yourself.
- 4) Relax by breathing exercises.
- 5) Take care of the end of range.
- 6) Better the muscle are rested before.
- 7) After sport – cool down and stretch
- 8) Do not start to stretch with long lever – start with short lever.
- 9) Think about that muscles works over one and more articulations. (punctum fixum – punctum mobile)
- 10) Inhibition – Agonistic and Antagonistic work will help to save the body and you have a better control

### **Summary**

#### **Warm up**

1. Step: Global warm up by the cardio-vascular system.
2. Step: Gymnastic – to get the arthro-functional condition and the visco-plasticity.
3. Step: Sport-specifically – to get ready for Training or competition.

### **Summary**

#### **Cool down**

1. Step: Global cool down by the cardio-vascular system
2. Step: Gymnastic – to loosen the local muscle reaction.
3. Step: Relaxation by stretching, PMR and breathing.

### **What can we stretch?**

- **Skin**
- **Tendons – Ligaments**
- **Muscles**
- **Bones**
- **Nerves**

### **How can we stretch?**

- **Active**
- **Passive**
- **Functional**

### **Types of Stretching**

- **Dynamic**
- **Static**
- **Functional**

### **Can muscles relief?**

- **Joints?**
- **Articulations?**



**First „pain-free“, then “normal movement” and only then “training”!**

**Always start your exercise program from the short over the middle up to the long lever.**

**Always start your exercise program with simple/linear movements and increase over the two-dimensional up to the three-dimensional movement, as it gives the sporty movement.**

**“Practice” doesn’t  
make “Perfect”  
but  
”Perfect-Practice”  
make “Perfect”**