



PÉCSI TUDOMÁNYEGYETEM  
ÁLTALÁNOS ORVOSTUDOMÁNYI KAR

# Personalized risk assessment, primary, secondary and tertiary prevention

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# Sport injuries

- Sport is the the leading cause of all injuries in youth, but also has an impact on the adult population.
- The financial implications of sport-related injuries are huge. (Finch et al., 2015)
- What could be the reasons?



# Concept

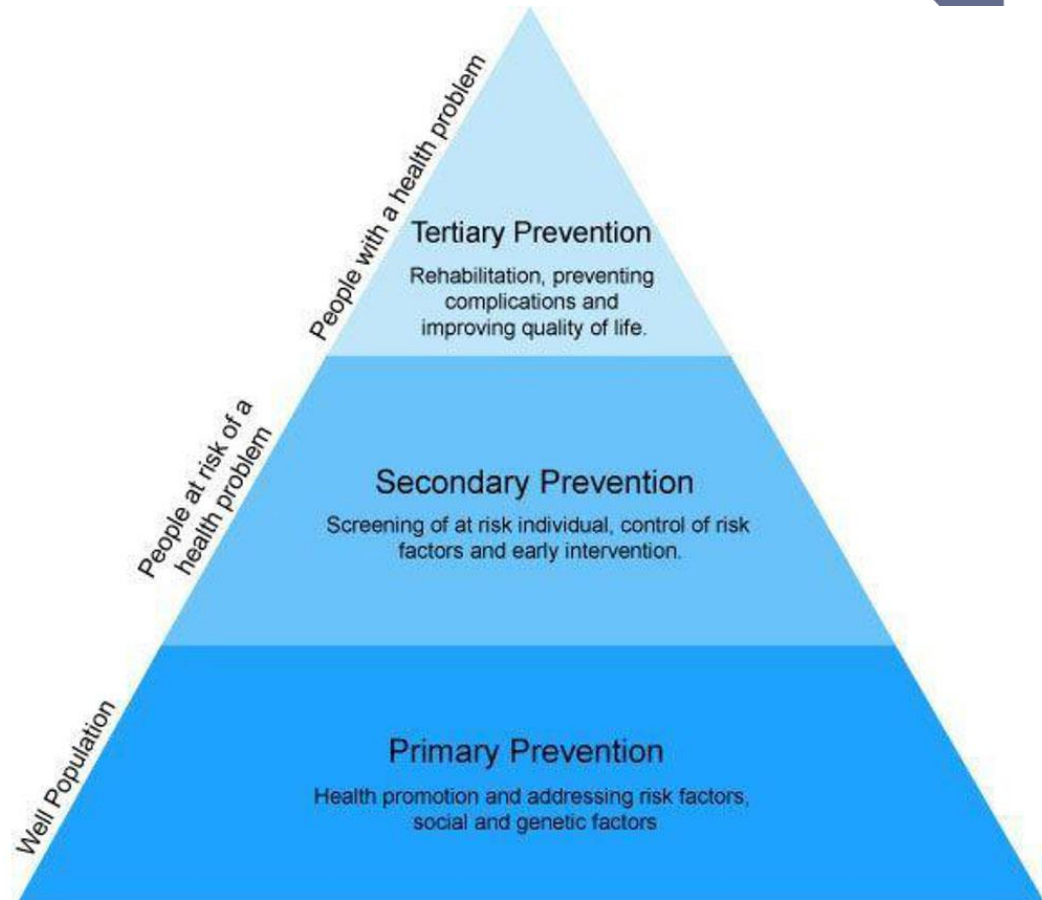
- Prevention report/ What does the word prevention mean?
- A set of efforts to improve and maintain health and to restore health as soon as possible in the event of damage, and to prevent further damages.



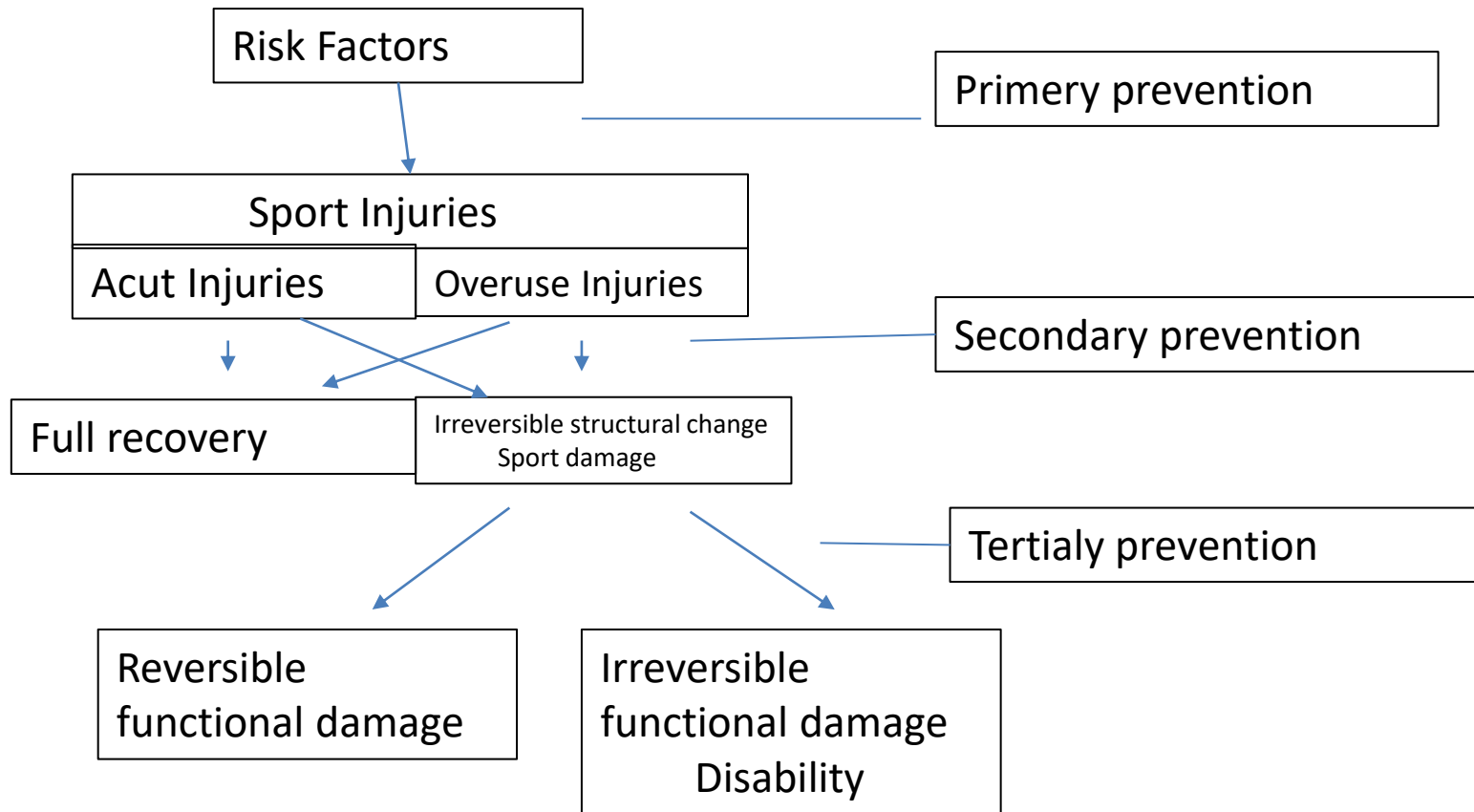
**PREVENTION**

# Levels of prevention

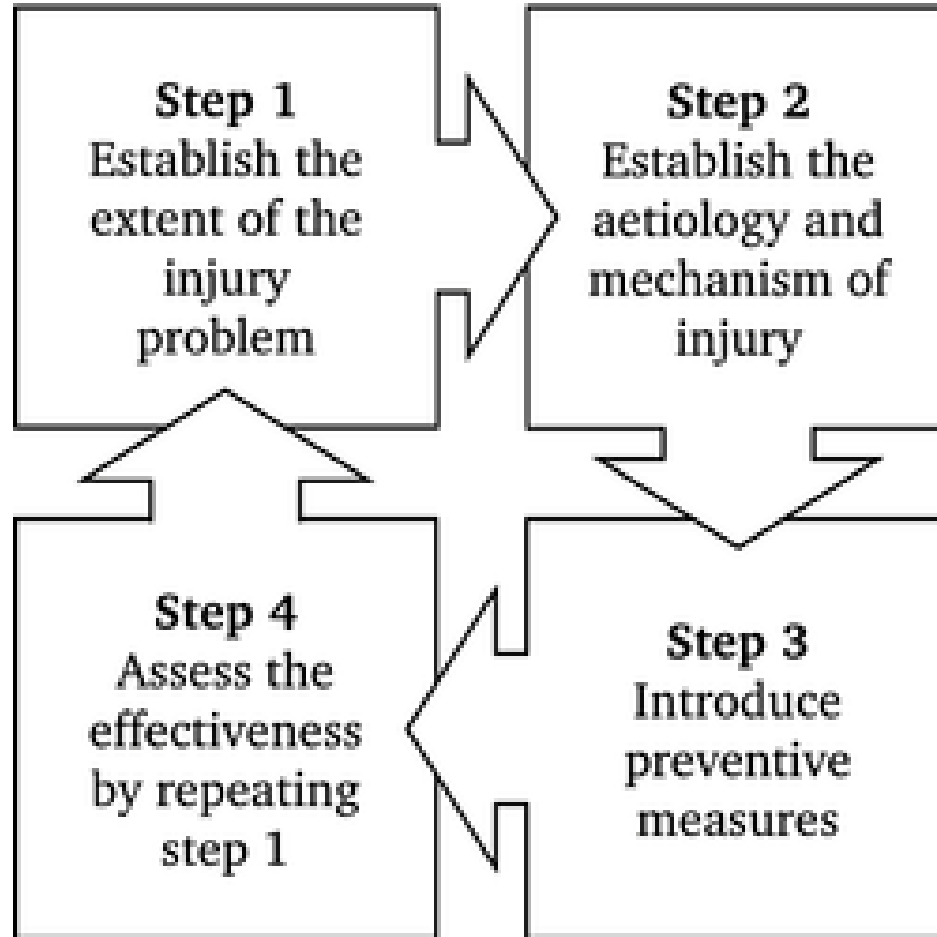
- primary
- secondary
- tertiary



# Levels of prevention

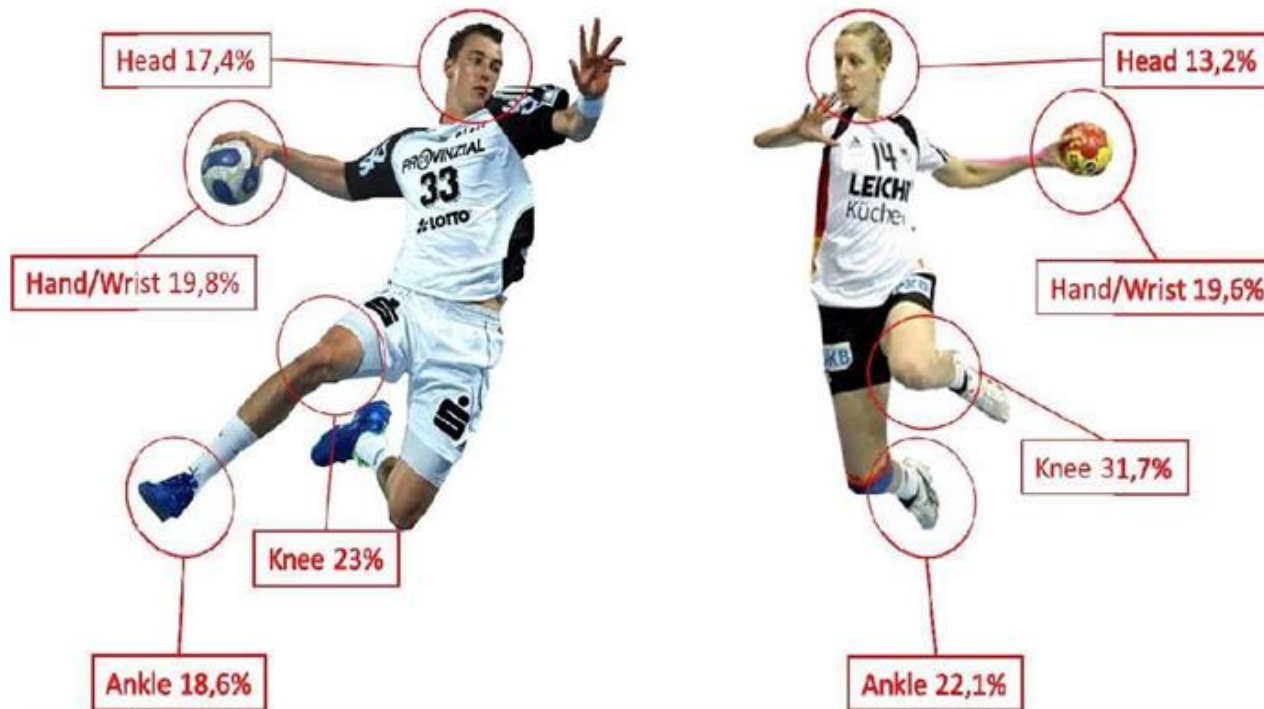


## Four step of sports injury prevention



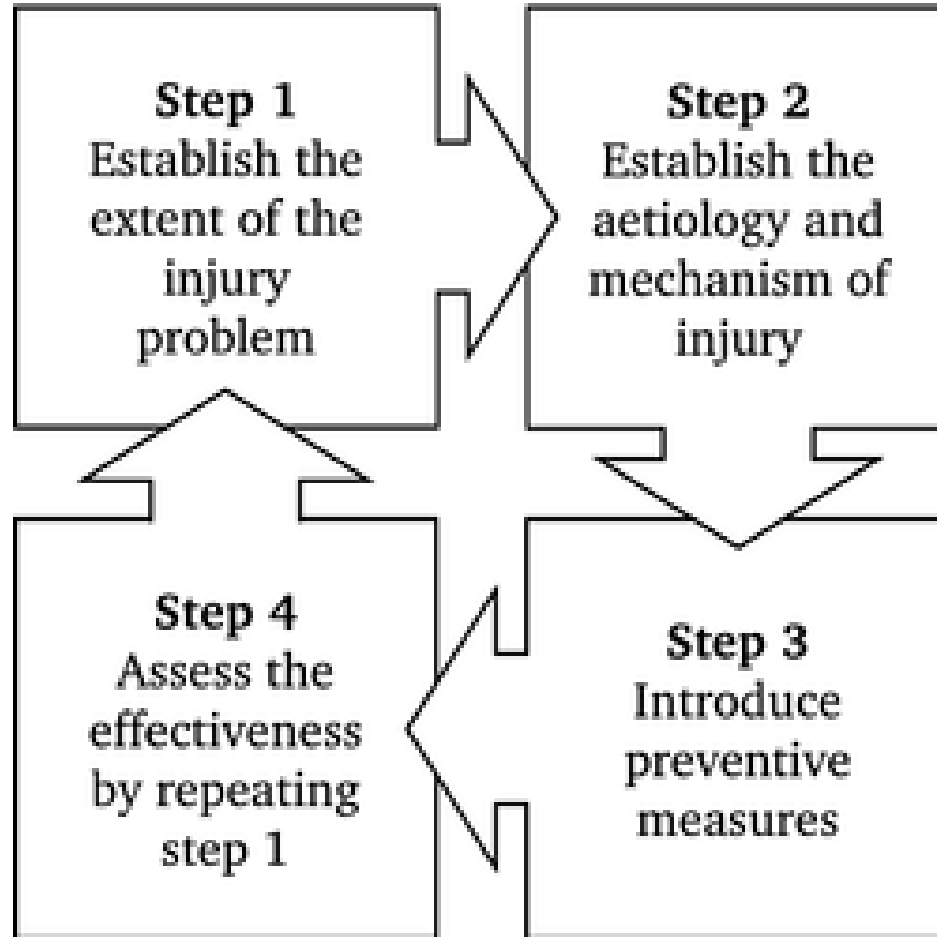
Injury Prevention Model as described by Van Mechelen.

## Prevention, injury prevention in handball



1. figure: Anatomical localization of lesions by gender

## Four step of sports injury prevention



Injury Prevention Model as described by Van Mechelen.



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# Sport injury prevention programs

- training strategies
- modification of sports rules and changes in policies
- equipment recommendations
- Internal factors (age, gender, fatigue, unstable mental state, lack of warm-up, diseases, injuries)
- External factors (location, geographical environment, climate and weather conditions, sportswear and sports equipment, and sports partners)



## Extended warm-up programs

They include several neuromuscular training components such as:

- aerobic components
- balance
- strength
- agility

These programs must be feasible and fit in a real-world sporting context (e.g. as part of the warm-up routine and with no added equipment required).

ACL injury prevention program:

<https://www.youtube.com/watch?v=RI1lZF5k1gs&t=10s>



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# Wearable tech

01. Apple Watch Series 8



08. Hykso Tracker for Boxing



[https://www.youtube.com/watch?v=BC-mXV\\_v0jE](https://www.youtube.com/watch?v=BC-mXV_v0jE)

02. Catapult GPS Vest



07. XMetrics Pro Swim Tracker



## 10. HEXOSKIN SMART CLOTHING

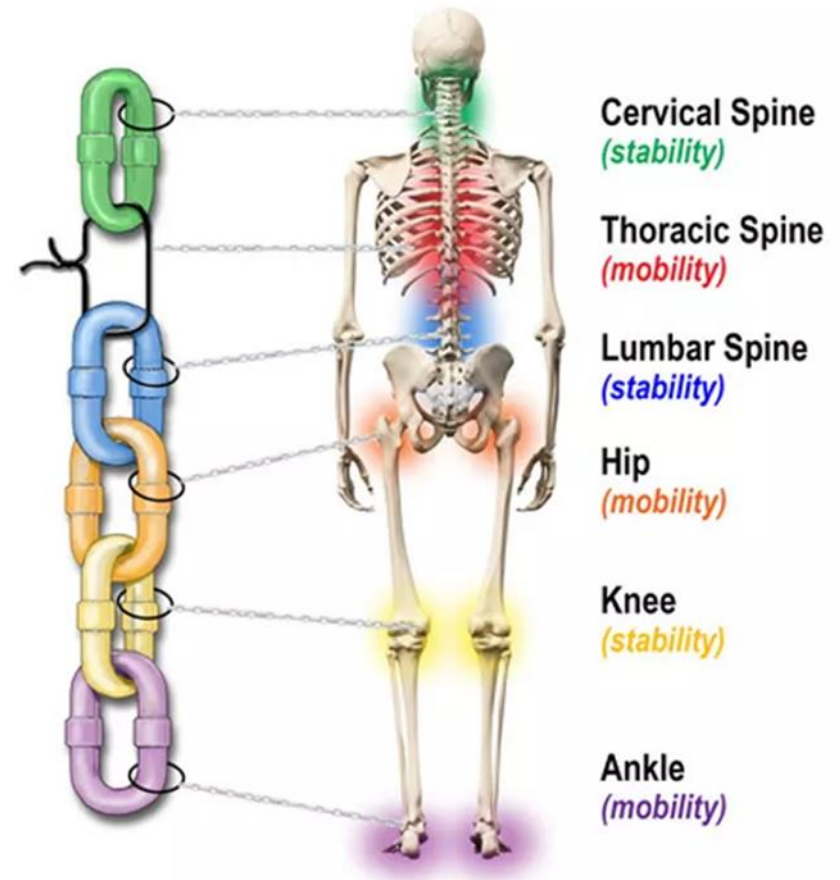


<https://www.youtube.com/watch?v=y-GDCm0M23M>



## The need for joint training

- **Ankle** – mobility
- **Knee** – stability
- **Hip** – mobility
- **Lumbar spine** – stability
- **Dorsal spine** – mobility
- **Scapula** – stability
- **Shoulder** – mobility



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# Aspects of compilation of exercises

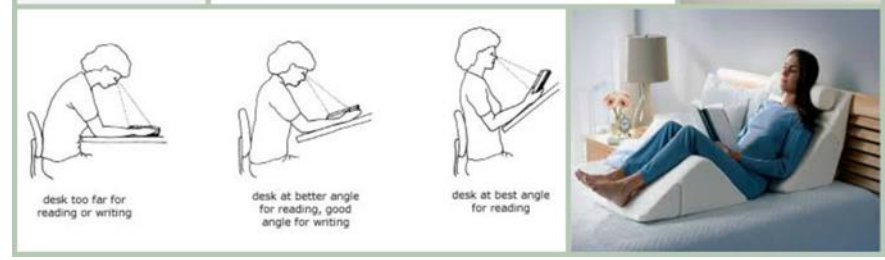
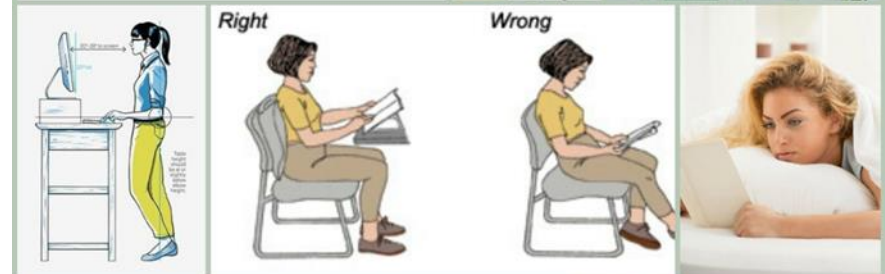
## 1. Cervical spine stabilization



2016



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# Aspects of compilation of exercises

## 1. Cervical spine stabilization

In a bend position the load on the neck is bigger because of the weight of the head  
Soft tissues are overloaded  
Muscle spasm, herniated discs

Solution of the problem:

Keep your neck in neutral position  
Rise books, phones to eye level  
Exercise for good posture, myofascial release around neck and shoulder



# Aspects of compilation of exercises

## 2. Thoracic spine and shoulder mobilization for protection of the lumbar region

We need thoracic mobility for the full range of motion of the shoulder joint  
For arrange the 180 degree in flexion/abduction the thoracic kyphosis has to become flat  
If it is impossible, we compensate with increasing of the lordosis of the L-spine





# Aspects of compilation of exercises

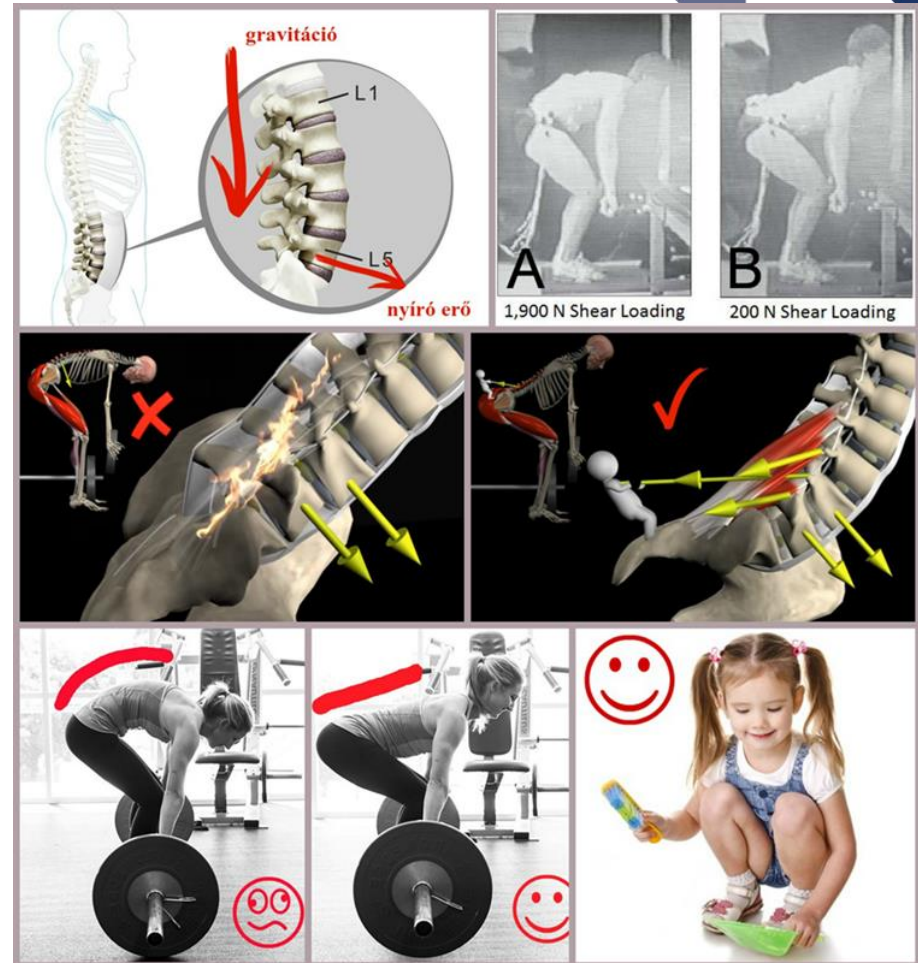
## 3. Lumbar spine stabilization

The most common reason of spine injuries are the lifts in bad posture

Lifting with bended lumbar spine(A), with flat/neutral position(B)(S.M.McGill:

*Biomechanics of low back injury: Implications on current practice and the clinic.* Journal of Biomechanics 1997:30(5) p. 465-475)

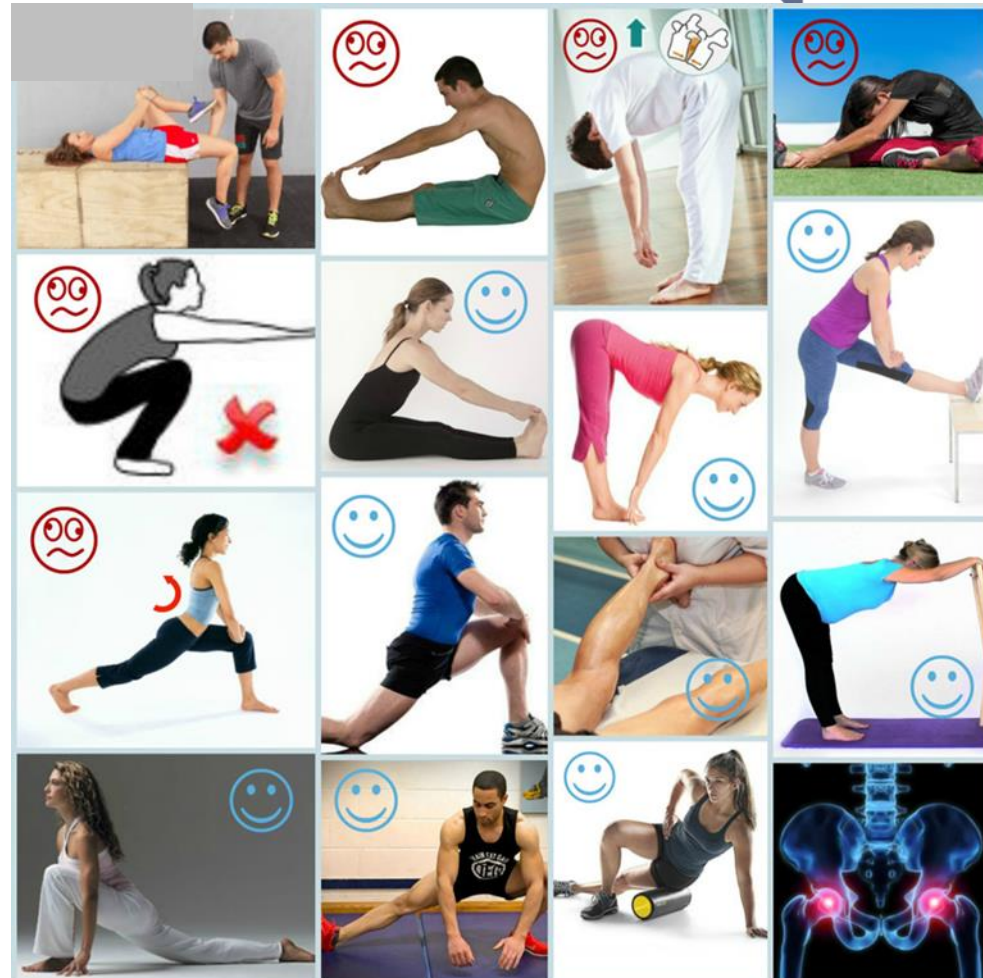
Back muscles are stretched, so weak



# Aspects of compilation of exercises

## 4. HIP mobilization

- Flexion contracture
- Extension contracture
- Abduction contracture



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# Aspects of compilation of exercises

## 4. HIP mobilization

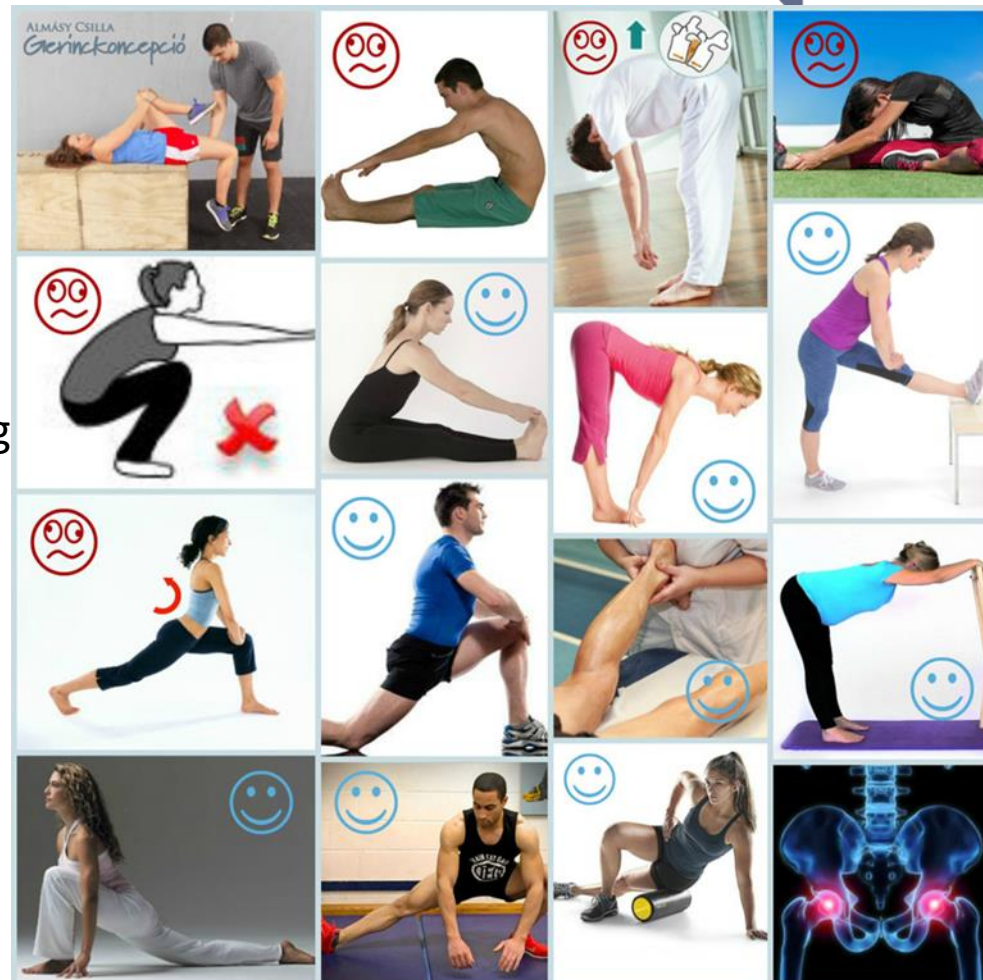


### Extension contracture

They cannot sit with straight legs on the floor without of bending the L-spine

Reasons: shortening of hamstrings, gluts, long adductors)

Solution: myofascial release, foam roller, triggerpoint release, dinamic and static stretching





# Aspects of compilation of exercises

## 4. HIP mobilization

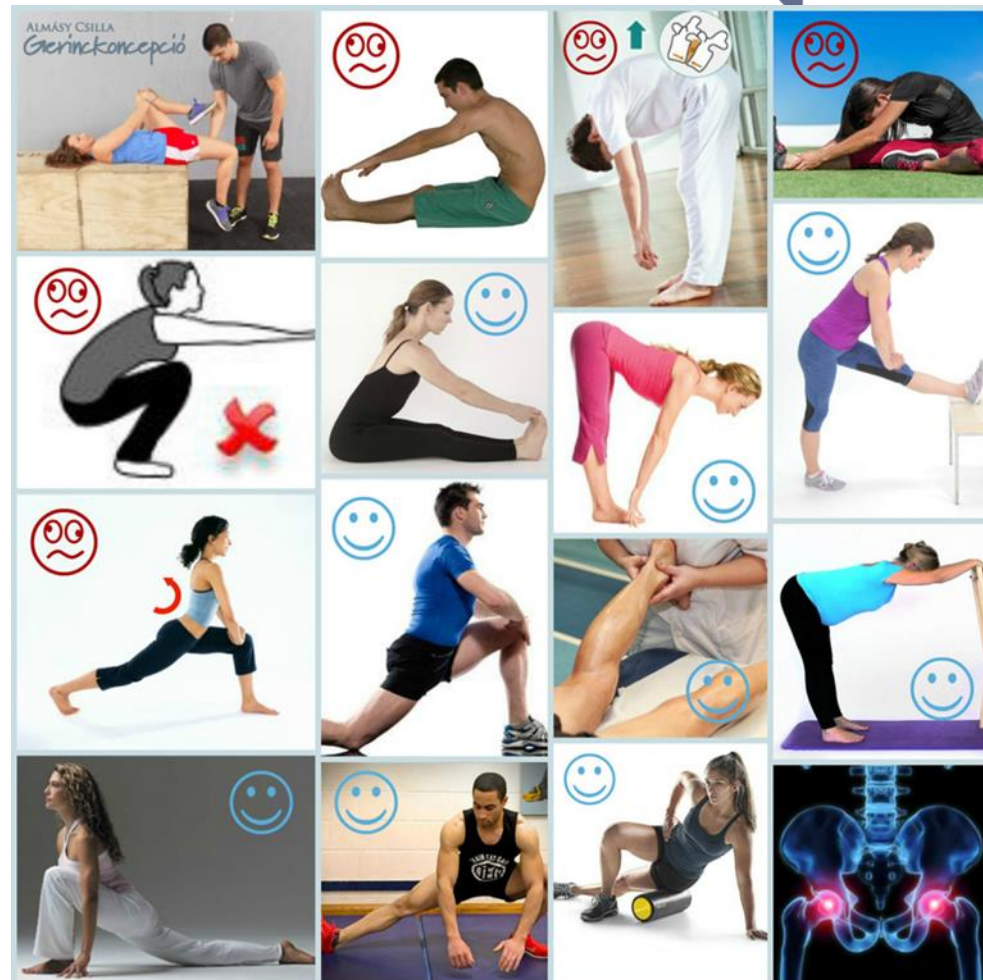
### Flexion contracture

We can compensate with the L-spine during walking, running, lunges

Reasons: hip flexors, short adductors are shortened – anterior tilt of the pelvis, SI irritation

Solution:

Myofascial release, stretching, triggerpoint release,...

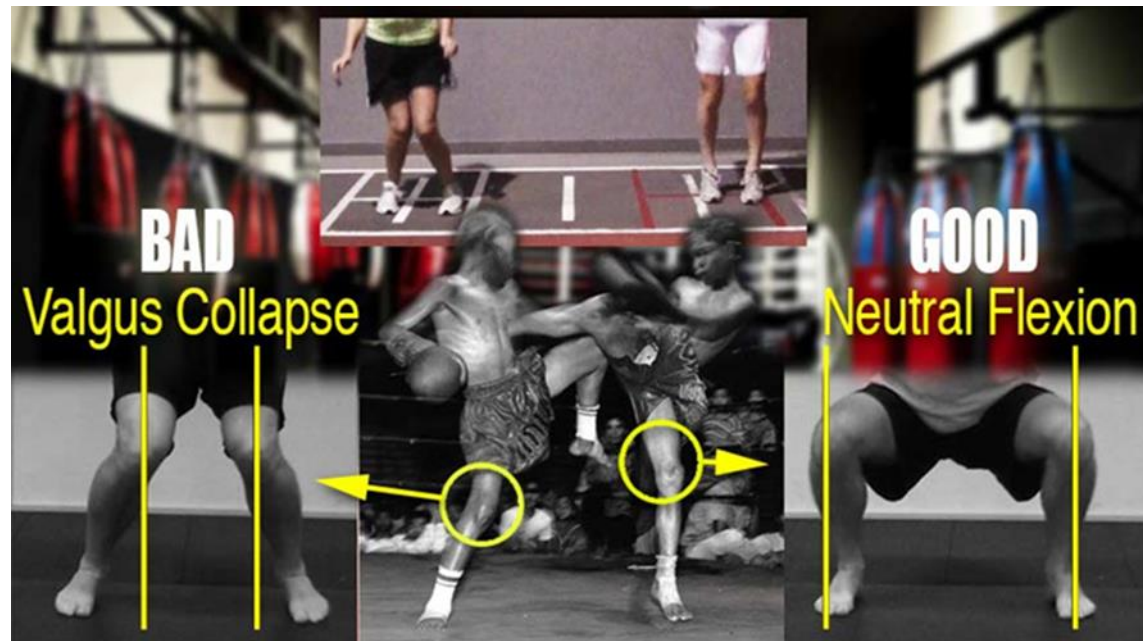
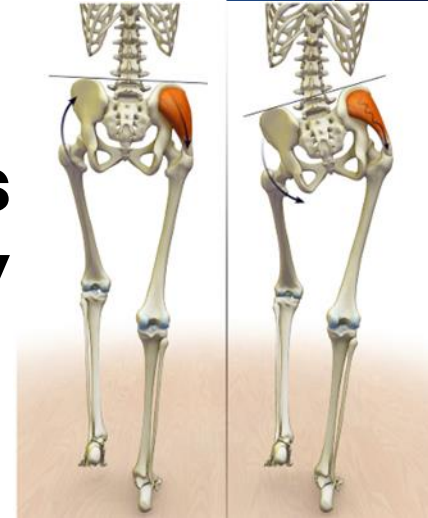


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# Aspects of compilation of exercises

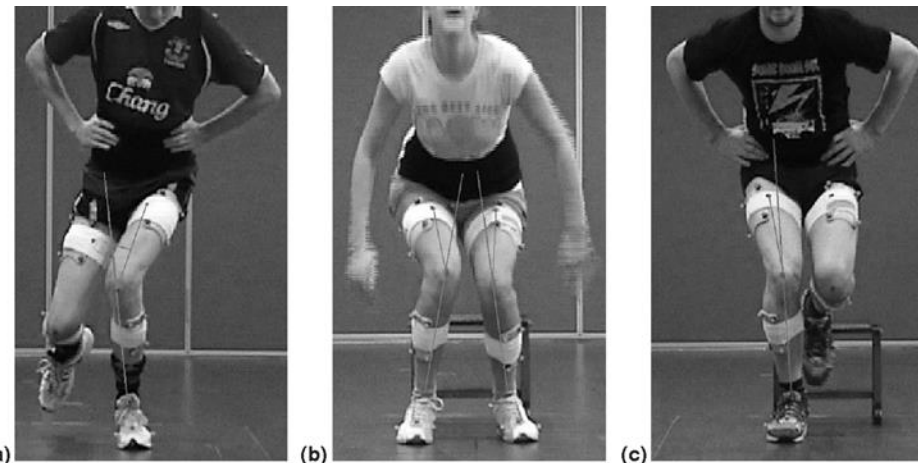
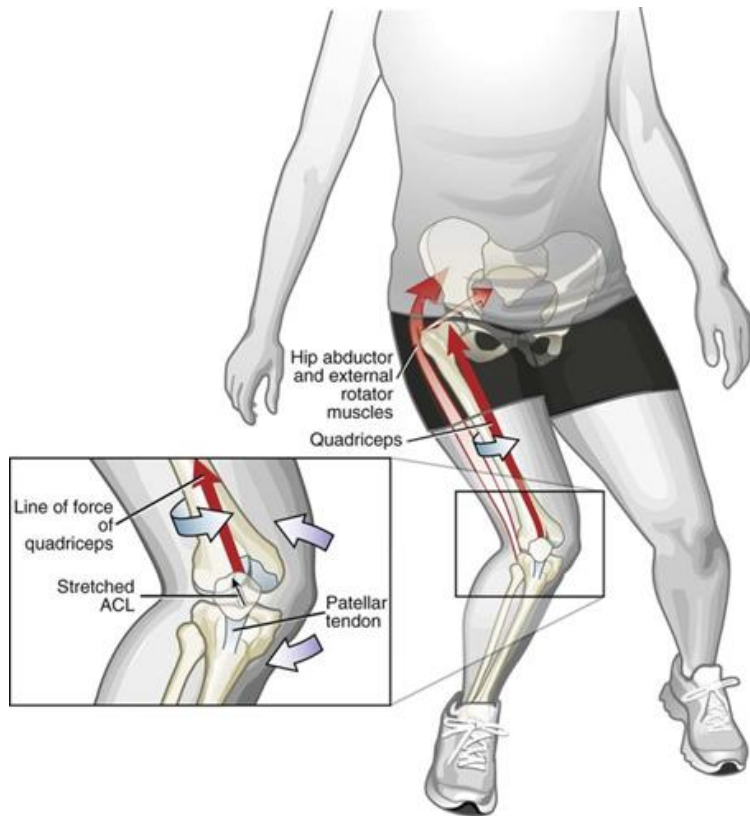
## 4. HIP strengthening for the knee stability

The gluteal muscles play an important role in stabilizing the lower limb joints.



# Aspects of compilation of exercises

## 4. HIP strengthening





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## Aspects of compilation of exercises

5. Excentric training
6. Proprioception training
7. Joint centralization
8. Neuromuscular training



# Aspects of compilation of exercises

## 9. Core training

- With every simple movement, the spine-stabilizing function of the core muscles is activated.
- If the core muscles are not strong enough, they decrease the real strength of the body
- Trunk muscles are part of the movement chain, and have important role in power transmission

### Roles:

- Standing on one leg
- Lateral bending forces –
- Compensation of rotating forces (during collisions, changes of direction)





## Quiz

1. Which are external factors?: Which are internal factors?:  
a) climate b) mental state c) age d) sports partner e) weather f) gender
2. Which are acute sport injuries? Which are overuse sports injuries?  
a) Tennis elbow b) tibia fracture c) rotator cuff tear d) Achilles tendinopathy
3. Which level of prevention does the use of roller-soled shoes belong to?  
a) Primary b) secondary c) tertiary



# Thank you for your attention!



## Prevention

PTE295

