

Musculoskeletal diseases and rehabilitation duties in case of ergonomic injuries



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Approximately 60% of the work-related diseases are musculoskeletal disorders, thus prevention at workplace is extremely important !

Risk factors at workplace

➤ **Physical**

- overloading with sudden onset or with long-lasting period
- monotonous, repetitive work with accelerated pace and short break which can lead to microtrauma
- long-lasting static and abnormal anatomical position of the joints

➤ **Other factors:** temperature, vibration, accident, etc.

➤ Based on this list one of the most important roles of prevention is the avoidance of risk factors

Shoulder region

Periarthritis humeroscapularis

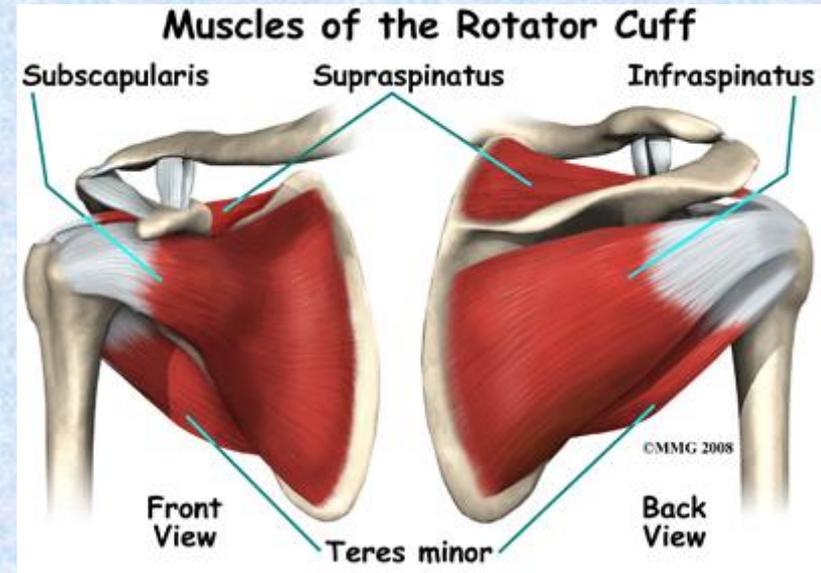
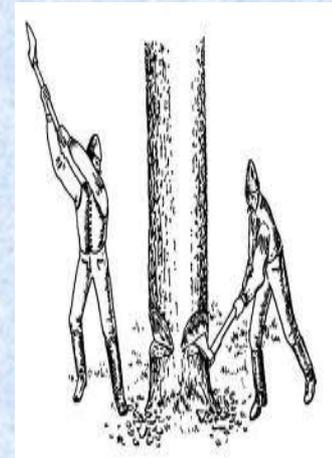
Degeneration of the rotator cuff.

➤ Causes:

continuously elevated arms (above horizontal) at work

➤ Typical professions:

- painter
- car mechanic
- logger
- bricklayer
- butcher



Periarthritis humeroscapularis



➤ Pathology:

Repetitive, abnormal, static position with long-lasting overuse of the muscles, typically from one direction.

monotonic overload – arterial compression by muscular spasm- restriction in blood supply to muscles - a shortage of oxygen- scar formation-degeneration

Periarthritis humeroscapularis

Prevention

- **Reduced speed of work**
- **Programs organized by the employer at workplace after working hours**
 - **Exercise** (stretching) - reduce one way load of muscles
 - **Massage** – make better blood circulation
 - **Taping technics** - improve muscular function



Periarthritis humeroscapularis

➤ Causes:

Cold temperature, climatization, air blast (wind)

➤ **Professions:** driver, office administrator

➤ **Prevention:**

- avoid direct contact with cold air due to incomplete thermoregulation and decreased temperature of the joints
- in addition long-lasting sitting position results in poor blood circulation with the lack of complete thermoregulation

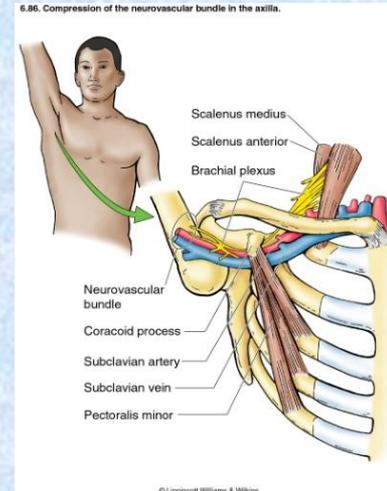


Thoracic outlet syndrome (TOS)

➤ Causes:

Permanent elevated position (above shoulder level) of the upper extremity

Repetitive injuries from job- or sports-related activities



➤ Professions:

- electrician, car mechanic,
- violinist
- swimming (butterfly, crawl)



The scalenus muscles become hypertrophic with time, narrowing the scalene fissure and causing compression of the brachial plexus (subclavian artery)

Thoracic outlet syndrome (TOS)

Prevention

- Taking breaks during work and correcting the position can reduce symptoms at the beginning of the syndrome
- Secondary prevention: if the symptoms worsen, changing the workplace should be necessary

Elbow region

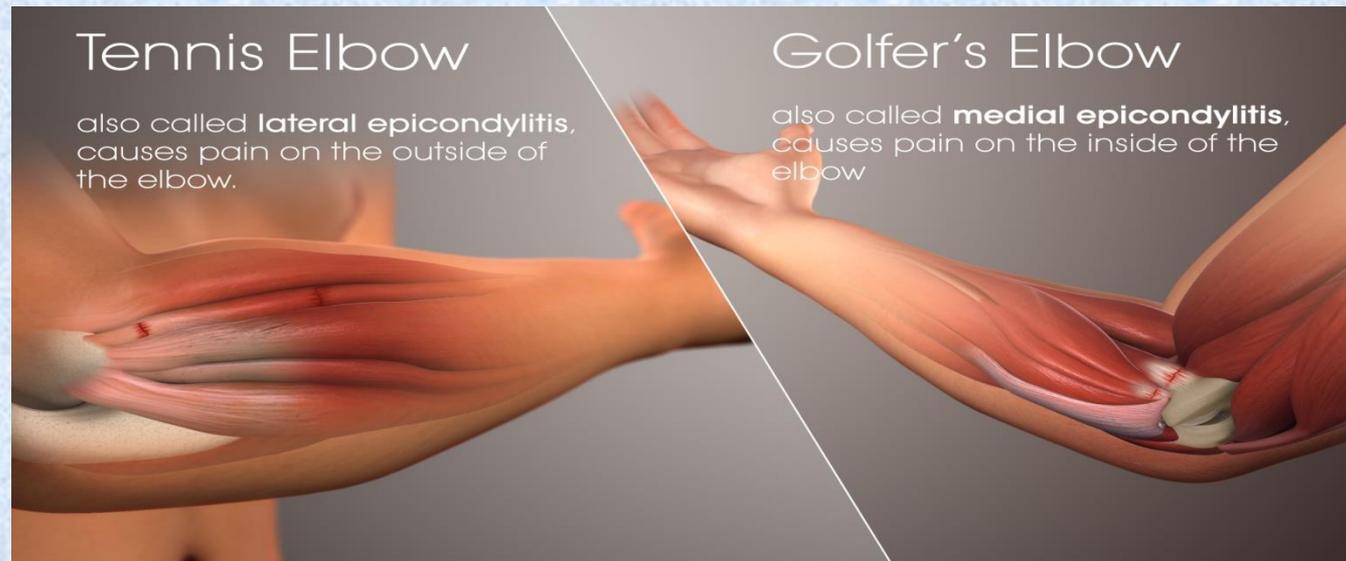
Tennis elbow (lateral epicondylitis)

Golfer's elbow (medial epicondylitis)

➤ Causes:

Damage to the muscles and tendons that control wrist and fingers.

The damage is typically related to **excessive or repeated stress**, such as improper lifting, throwing or hitting, as well as any activity that requires **repeated supination and pronation** of the elbow.

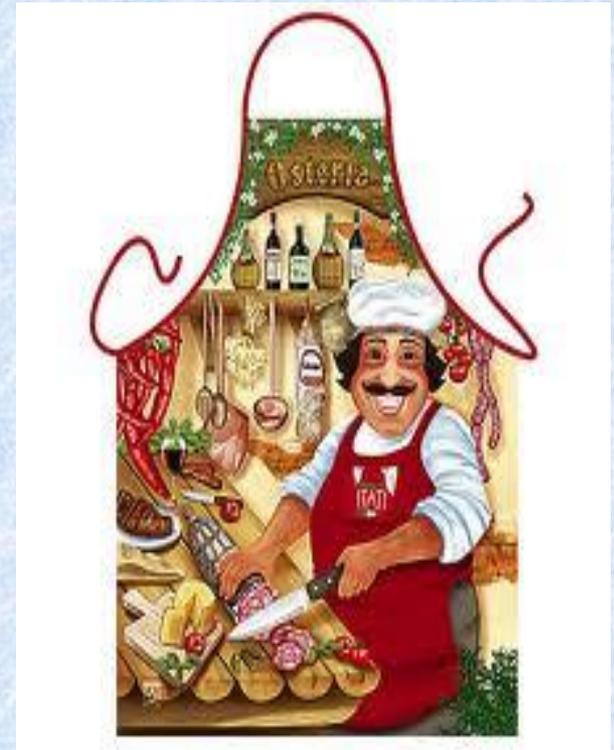


Tennis elbow (lateral epicondylitis)

Golfer's elbow (medial epicondylitis)

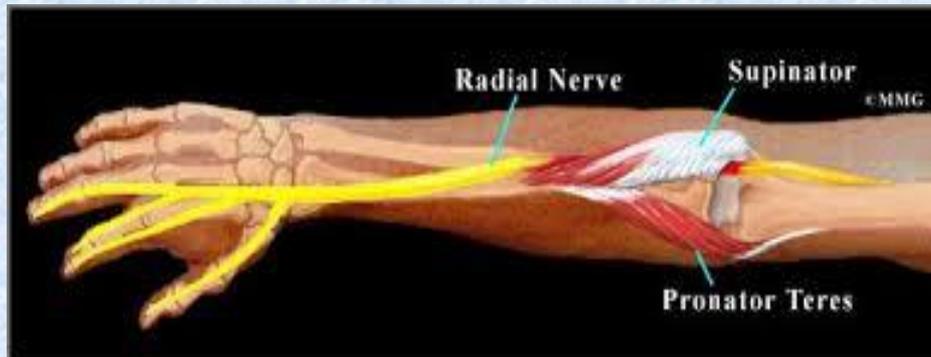
➤ Professions:

- butcher, cook,
- electrician,
- musician,
- painter



Radial tunnel syndrome of the elbow

Cause: compression of the radial nerve by the **repeated supination** eventually causes muscle weakness of the forearm



Tennis elbow, Golfer's elbow, Radial tunnel syndrome

Prevention

- Build up loading and intensity of the work gradually
- Training and education about the adequate technique
- Secondary prevention: tape application and assistive devices – elbow support



Wrist and hand region

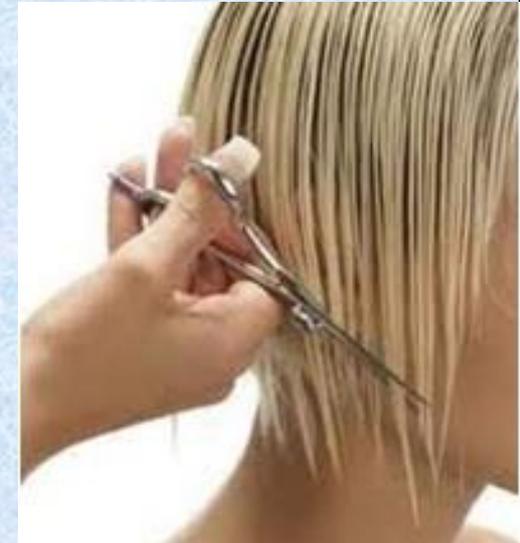
Tendinitis of the fingers

➤ Causes:

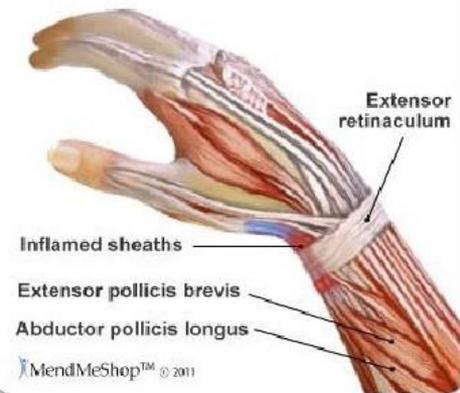
- overload/overstrain
- repetitive, monotonous working with extension and abduction of the fingers

➤ Professions:

- hairdresser (using scissors)
- computer work (typing)



De Quervain's Tenosynovitis



Carpal tunnel syndrome

➤ Compression of the median nerve

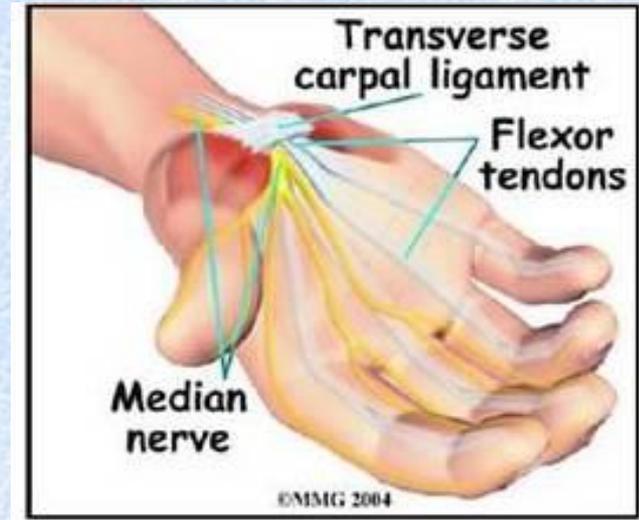
➤ Causes:

- repetitive wrist movements (flexion-extension)
- improper position of the wrist (dorsiflexion)
→ tenosynovitis of the flexor muscles of the forearm with swelling, which narrows the carpal tunnel

- vibration
- local trauma

➤ Professions:

- administrative/computer work



Tendinitis of fingers and Carpal tunnel syndrome

Prevention

- Correct position of the wrist during work with usage of wrist support such as special mouse pad



- Secondary prevention:
using assistive devices during work, such as splint to maintain ability to work

Cervical and thoracic spine

Pain of the cervical and thoracic spine

➤ **Causes:**

Prolonged incorrect posture with static load

The neck is bending forward with curved spine

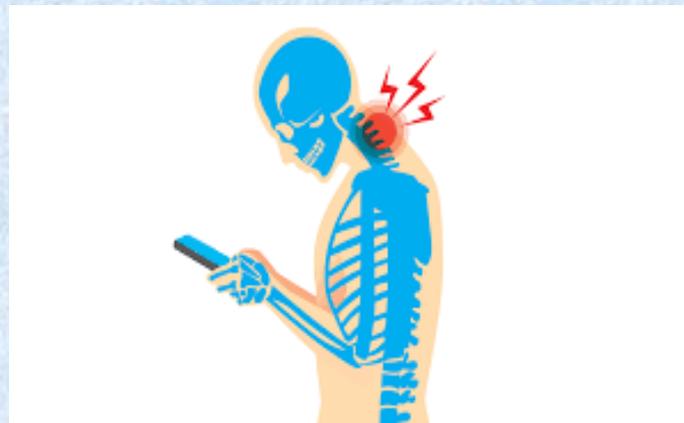
- tension of the muscles of the neck and back - the arterias of the muscles get compressed -low blood circulation

➤ **Symptom:**

Painful tension of the muscles of the neck and back



Text neck is the term used to describe the **neck** pain and damage sustained from looking down at your mobile phone, tablet, or other wireless devices too frequently and for too long.



Pain of the cervical and thoracic spine

➤ Professions

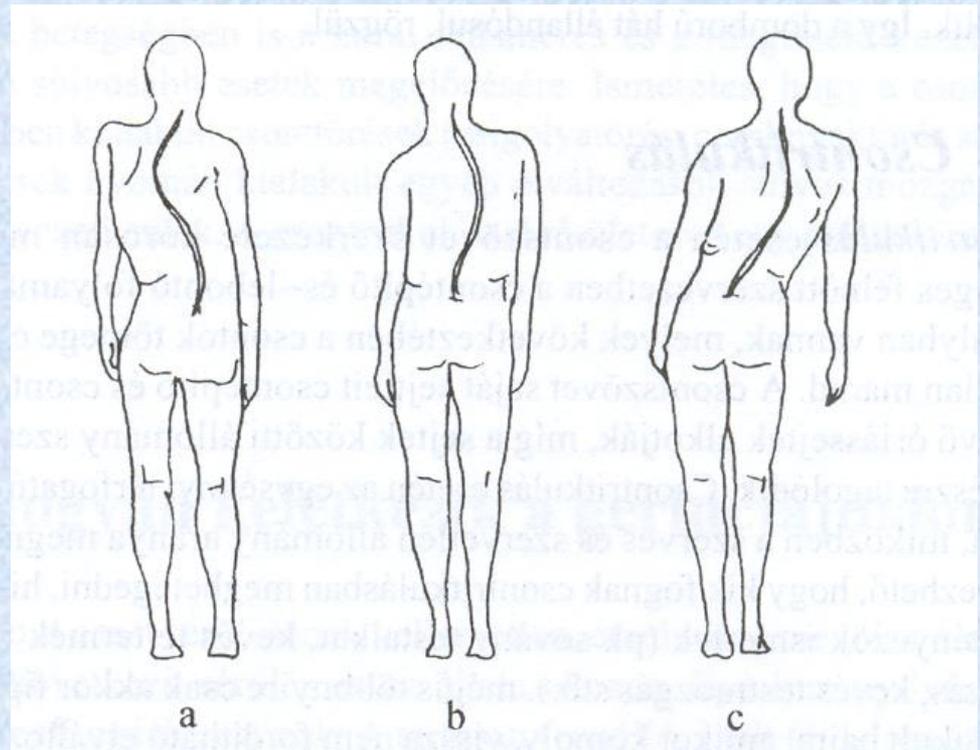
- painter
- dressmaker



Both workers of standing and sedantary professions may suffer from pain because of incorrect posture

Pain of the cervical and thoracic spine

Incorrect posture in childhood can also develop **scoliosis**



Pain of the cervical and thoracic spine

Prevention

- Education about correct sitting posture for computer by specialist if needed
- role of the employer is very important in organising this education and providing adequate working environments



Pain of the cervical and thoracic spine

Prevention

- **Regular exercise** – program organised by the employer:
 - The employer can provide a room for exercise (stretching the muscles and mobilizing the joints) **at the workplace**
 - The employer has other possibilities to support physical activity **outside the workplace** - providing tickets for fitness rooms run by physical therapist, or swimming pools



Why the stretching is so important?

Purpose of regular exercise:

- To relieve painful muscular tension resulting from abnormal, static position
- to prevent muscular shortening caused by monotonous work



Role of health development - exercise at work!

➤ **Prevention** is extremely important to avoid or decrease back pain, fatigue, lack of concentration, days of sick leave and to increase work productivity.

Previous studies reported that absenteeism, presenteeism, early retirement and disability related to chronic back pain mean a significant burden for the patient's quality of life and also for society.



Pain of the cervical and thoracic spine

Prevention

Special equipments (back support or back brace) during work
- maintain correct anatomical posture and decrease symptoms



Lower back region

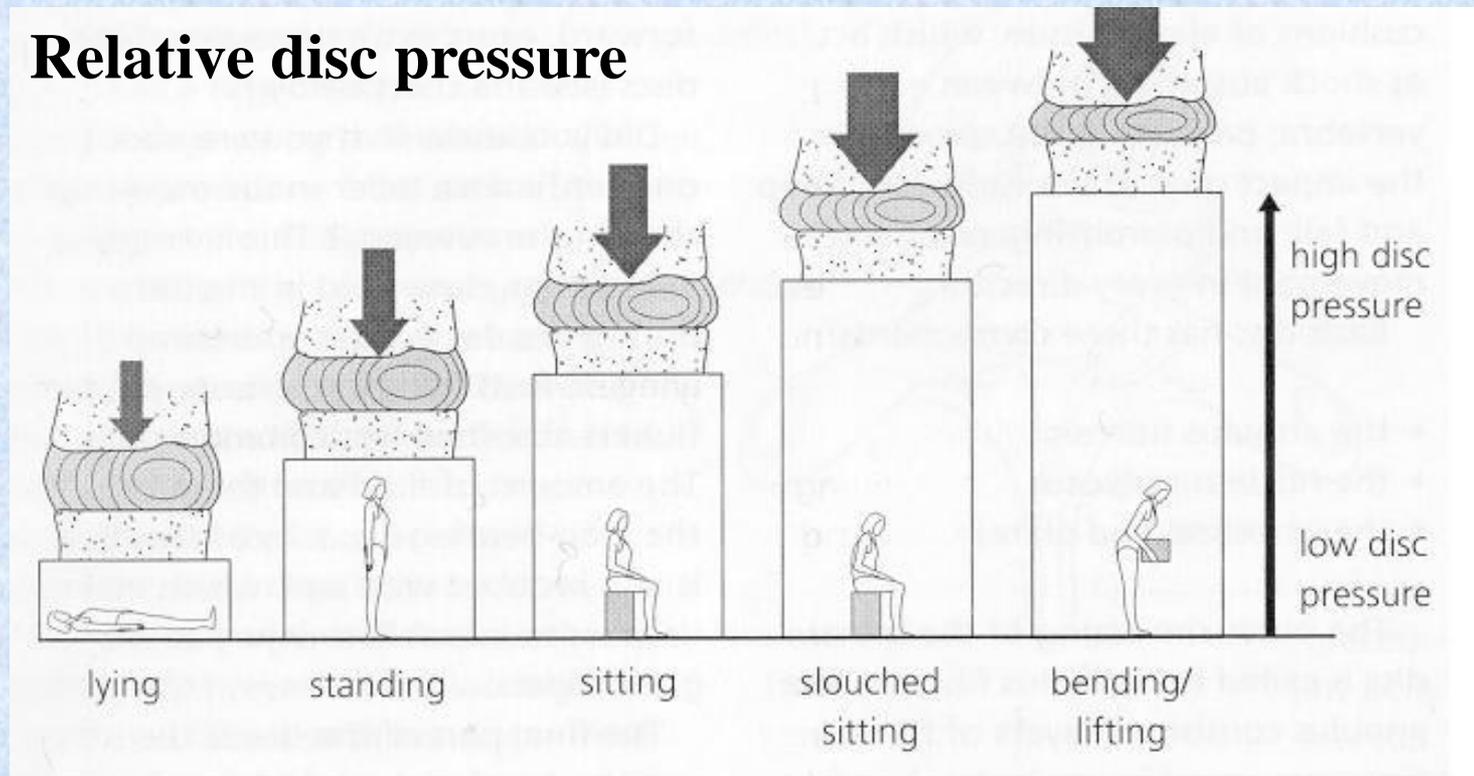
Spinal disc herniation = slipped disc

➤ Causes:

Incorrect posture of the lower back during work such as bending forward with a **curved spine**

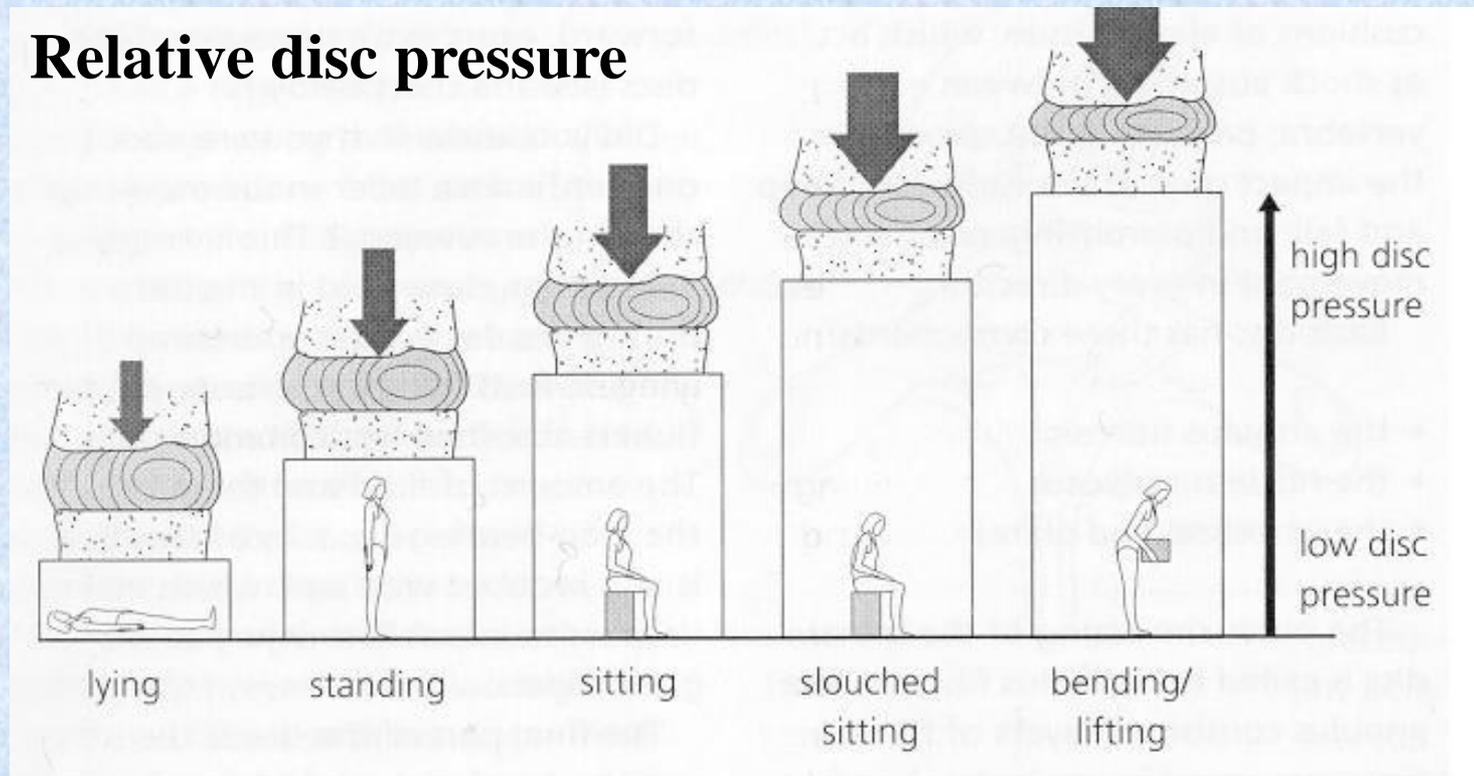


Why the curved spine is so dangerous?



The effect of five postures on the intervertebral disc pressure as measured between the 3rd and 4th lumbar vertebrae. The pressure when standing is taken as 100%.

Why the curved spine is so dangerous?



- The lowest pressure on disc is in lying position
- The sitting position, especially with curved spine is significantly worsen comparing to standing position
- The biggest pressure on disc is during bending and lifting

Sudden movement is dangerous!!!!!!!

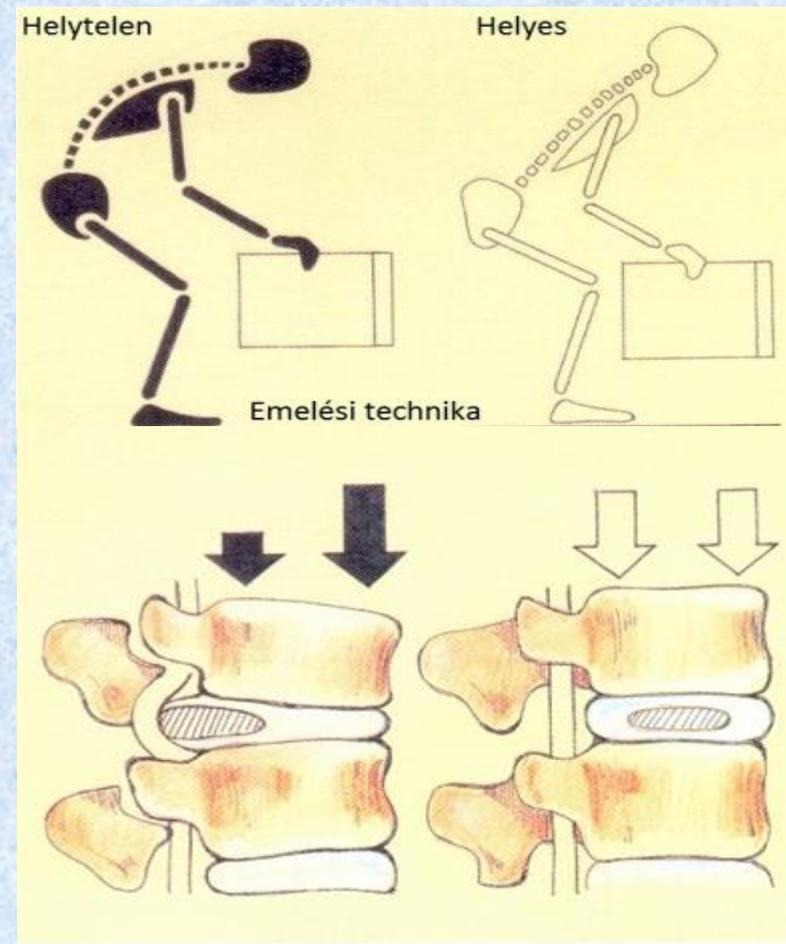


Lower back pain Prevention

- Improper lifting techniques can cause injury to the muscles, joints, and discs in your back
- Lifting a load in a correct posture, the disc cannot slip on it's place

Prevention

- do not attempt to lift by bending forward
- bend your hips and knees to squat down to your load, keep it close to your body, and straighten your legs to lift
- avoid turning or twisting your body while lifting or holding a heavy object



Lower back pain Prevention

Correct posture of the lower back with **hand support** during physical work can help to reduce loads on the lumbar spine (carpenter)



Lower back pain Prevention



Assistive devices such as back support or back brace in lifting can help to reduce the risk of slipped disc



Lower back pain Prevention

Ergonomics furniture to comfortably conform to the body and reduce the risk of injury from stress and strain.



elastic support

Joints of the lower limb

Osteoarthritis of the hip and knee

Causes:

Extrinsic factors (changeable!)

- **Obesity.** Carrying extra body weight contributes to osteoarthritis in several ways, and the more you weigh, the greater your risk. Increased weight puts added stress on weight-bearing joints, such as your hips and knees.
- **Joint injuries:** sports (football-meniscal lesion) or from an accident
- **Certain occupations**



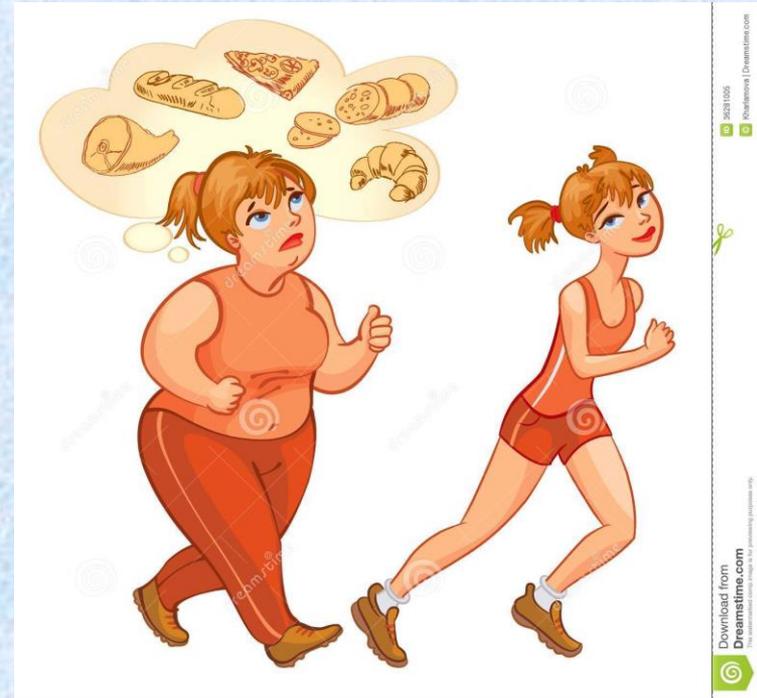
Osteoarthritis of the hip and knee

Prevention

Lifestyle changes can make a significant difference in osteoarthritis symptoms

Prevention: healthy diet - reform cuisine at the workplace

Lose weight. Obesity increases the stress on your weight-bearing joints, such as your knees and your hips. Even a small amount of weight loss can relieve some pressure and reduce your pain.



Osteoarthritis of the hip and knee

Prevention

- **Avoid static overload**
 - inserting dynamic motion: sitting - standing - **walking**
(even in a shop with a small area)
 - employment in a rotary system



Osteoarthritis of the hip and knee

Prevention

Avoid prolonged static position, in particularly bending or crossing of the knees and squatting



Osteoarthritis of the hip and knee

Prevention

Appropriate footwear

- instead of high heel shoes only 3-4 cm heels



- shock-absorbing shoes with softer insole and stiffer outer sole for running
- arch support



Osteoarthritis of the hip and knee

Prevention

- **Exercise** can increase your endurance and strengthen the muscles around your joint, making your joint more stable - walking, biking or swimming



- **Braces or shoe inserts** reduce pain when you stand or walk. These devices can immobilize or support your joint to help take pressure off it.

- **Knee taping** Strapping tape may help ease the pain of knee osteoarthritis

Thank you for your attention!

Take home message:

Prevention is important to avoid irreversible changes

„ Do the difficult things while they are easy”

/Lao-ce/

Pain of the cervical and thoracic spine

Prevention

- Standing desk



- Take a break regularly:
Top Tip: set a silent reminder on your phone or computer every 45 minutes to 1 hour, keeping you conscious about moving around and stretching often.