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DEMOCRITUS  
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# Musculoskeletal disorders in obese children – Guidelines for exercise

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Erasmus+

"This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein"

Co-funded by the  
Erasmus+ Programme  
of the European Union



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Κ Ρ Α Τ Ι Κ Ω Ν  
Υ Π Ο Τ Ρ Ο Φ Ι Ω Ν  
**IKY**

# Today...more hours sitting!

- The lack of physical activity undoubtedly has contributed to the alarming increase in the obesity rate of children and adolescents.
- Need for establishing good exercise habits early!

Department of Health and Human  
Services, USA, 2012



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# Impact of obesity in children

- Obesity in children is a significant public health problem, and it has the potential to have an impact on a child's osteoarticular health, resulting in ongoing chronic pain.

*Smith et al, 2014*



# The impact of being overweight or obese on a child's skeletal system

- pain,
- joint dysfunction
- bone fractures

*de Sa Pinto AL 2006*

- ankle,
- foot and
- knee problems
- ...than children who are within a normal-weight range for their age.

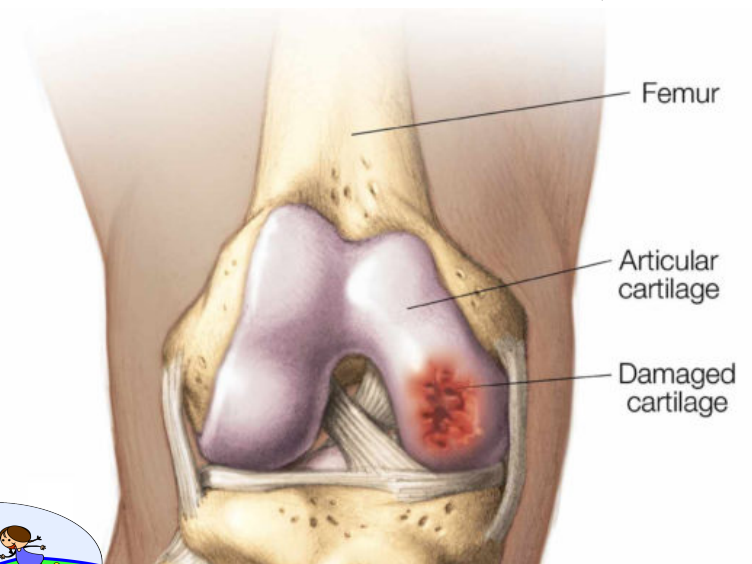
*Krul et al, 2009*



# Obesity and disability

- Degenerative osteoarthritis and cartilage breakdown along with musculoskeletal pain have been reported as part of the disability spectrum related to obesity.

*Mazzuca et al, 2014*



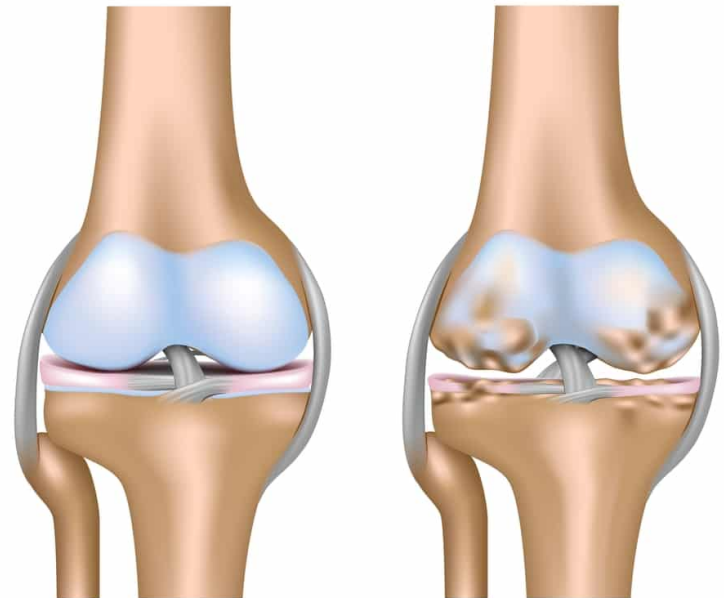
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# Osteoarthritis

- Overweight and obese children reported musculoskeletal pain primarily due to changes within articulating joints such as knee and ankle.

*Taylor et al, 2006; Krul et al, 2009*



Healthy knee joint

Osteoarthritis



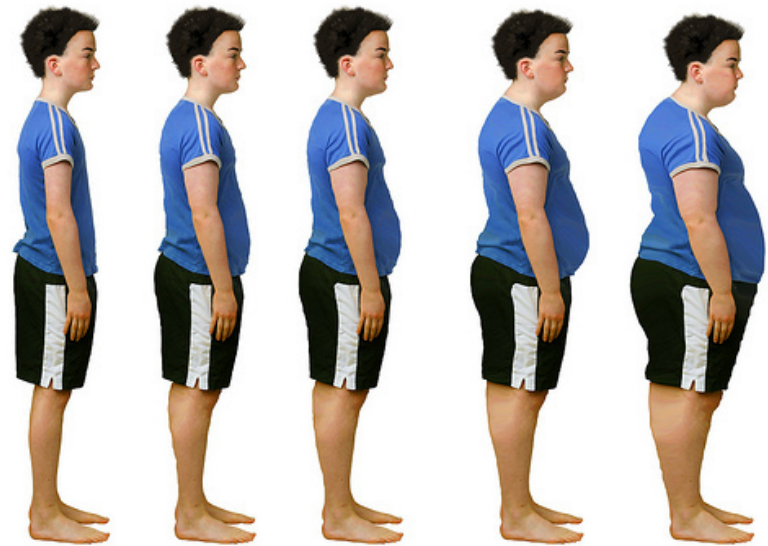
# Chronic nonspecific musculoskeletal pain in children and adolescents

- Has been reported as a common occurrence.
- Children affected by chronic musculoskeletal pain have been found to have increased levels of anxiety and depression, as well as lower levels of activity.

*Hakala et al, 2002; El-Metwally et al, 2004*



- Given that being overweight or obese in adult life affects health and well-being, overweight or obese in childhood requires further attention.



Credit: Combined Media @Flickr





# Lower limbs!!!

- general musculoskeletal pain in children in the lower limbs, 24% of children aged between 6 and 10 years of age. *Al-Khattat, 2000; Kaspiris et al, 2009*
- An increase in adiposity and fat distribution across the body is related to foot pain, and yet this relationship is not evident with an increase in muscle mass.

*Tanamas et al, 2012*



# More pain...more BMI!!!

- Interestingly, children who reported musculoskeletal pain in the back, hip, knee and/or ankle were found to have a significantly higher BMI than those without pain, with the odds of having joint pain increased by 10% for every 10-kg increase of weight and an increase of 3% for every unit increase in BMI.

*Stovitz et al, 2008*



# Sites of pain

- The sites of pain in these overweight and obese paediatric populations differ
- lower back, knees, ankles and feet, *Taylor et al, 2006; Krul et al, 2009; Bell et al, 2011*
- neck pain. *Krul et al, 2009*
- reported nonspecific musculoskeletal pain without specifying the pain site. *Hainsworth et al, 2009*



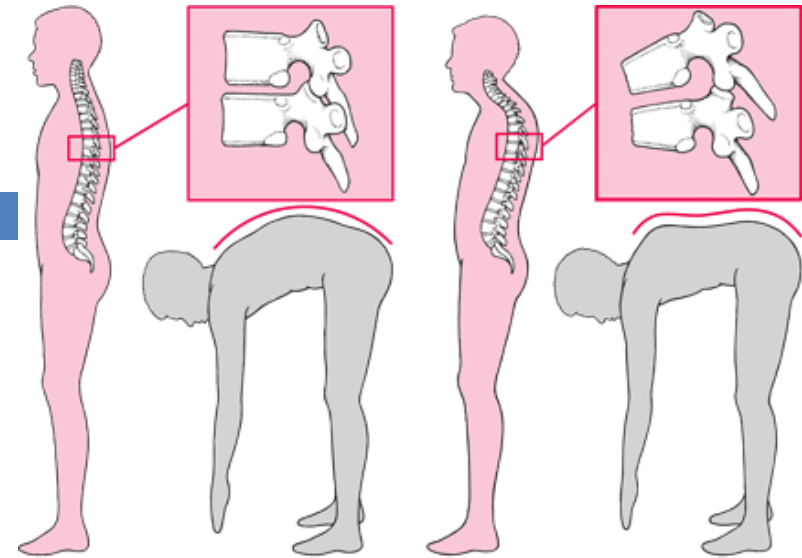
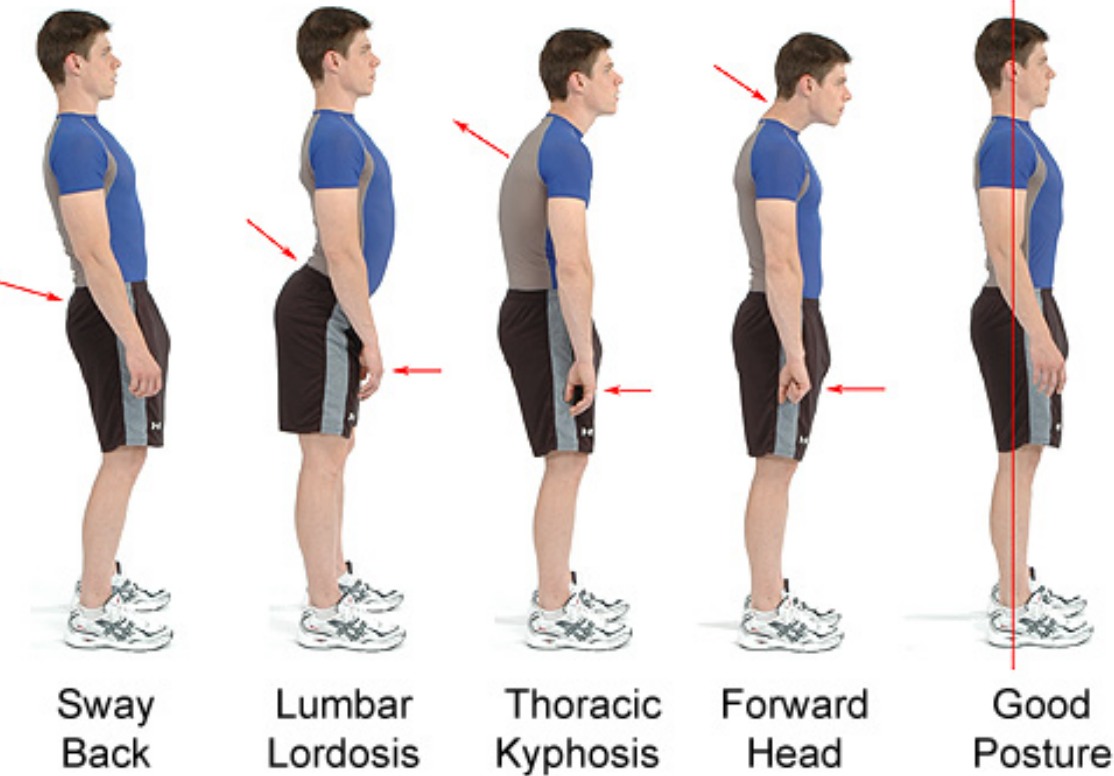
# Obviously spine issues...! WHY?



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# Spine deformities



Normal Anatomy

Kyphosis

## Types of Scoliosis

Thoracic

Lumbar



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# Tip! Use both straps and keep upright posture!



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# Tip!

Put heavier books towards the back of the backpack



# Knees: Blount's disease

- A growth **disorder** of the shin bone (tibia) characterized by inward turning of the lower leg (bowing) that slowly worsens over time. While it is not uncommon for young children to have bowed legs, typically the bowing improves with age.





# The effects of weight on the growth plate

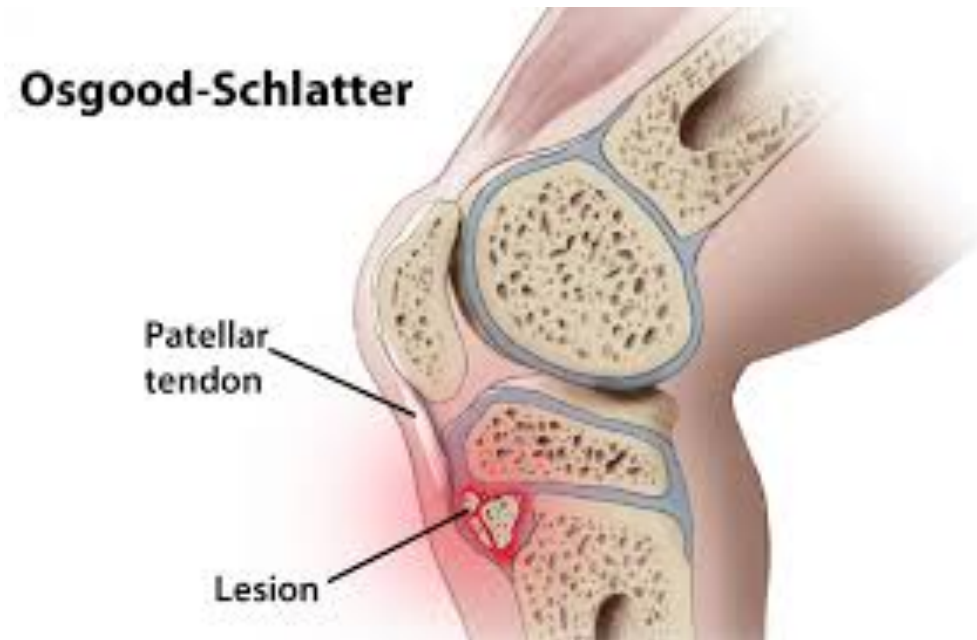


- Growth plate: It is the part of a long bone where new bone growth takes place;
- the whole bone is alive, with maintenance remodeling throughout its existing bone tissue, but the growth plate is the place where the long bone grows longer (adds length).



# Osgood–Schlatter disease (OSD)

- Inflammation of the patellar ligament at the tibial tuberosity. It is characterized by a painful bump just below the knee that is worse with activity and better with rest.
- Episodes of pain typically last a few weeks to months.

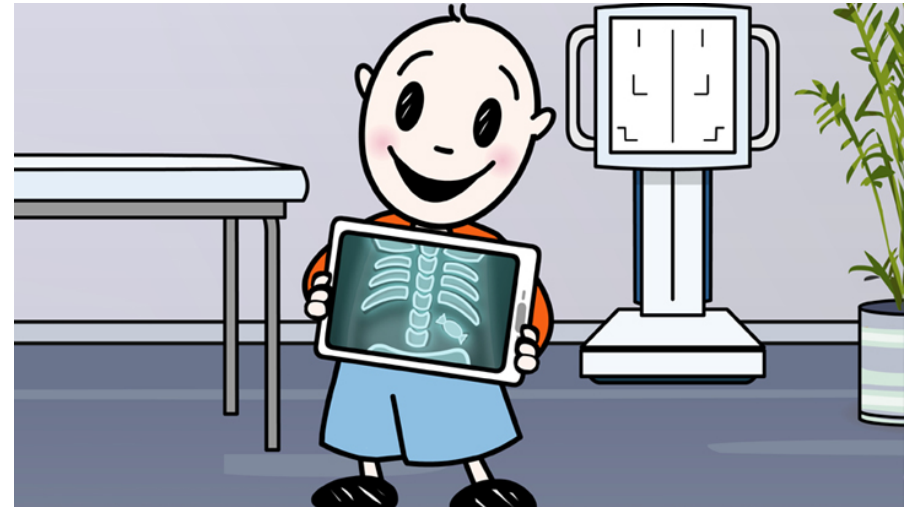


- Hip and knee flexion is also affected in obese children owing to an increase in concentric contraction of hip flexors, creating higher energy transfer and loads across hip joints, resulting in a change in gait to cope with the child's increased body mass. *Nantel et al, 2006; Shultz et al, 2009*



# Therefore...

- The reporting of musculoskeletal pain by overweight children may reflect a significant marker of a reduction in osteoarticular health and changes to skeletal structure.



# Consequences

- These conditions significantly reduce a person's ability to exercise, and in addition chronic pain has been reported to negatively influence a person's quality of life.

*Marcus 2004*



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# Screen time

- Sedentary activity and “screen time” is at an all time high, with youth ages 8 to 18 years spending an average of about 7.5 hours per day in front of a computer or TV screen.

*Bradford et al, 2012*



**Sometimes You Need To ...**



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**Change Your Point of View**



# Because...

- Our body is designed for **physical activity**, without enough exercise it starts to slow down, clog up and become unhealthy.



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# WHAT is being healthy?



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# Being happy ...

## able to do what you want to do!



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# Being physically healthy...

- Running around
- Playing sports
- Dancing...playing...

...without limitations or restrictions!!!



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# Better grades at school!!!

- Mental health
- Learning in school



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# Being physically healthy

- Being socially healthy
- Playing with your friends



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# Why be physically active?

- ❑ Makes you happier and smarter!
- ❑ Makes you better at activities you enjoy
- ❑ More energy
- ❑ Lifelong health-Live longer
- ❑ Less sickness and diseases
- ❑ Stronger bones and muscles
- ❑ Your heart and lungs get stronger!
- ❑ Growth and development
- ❑ You look great!



# Why be physically active?

- You can breathe faster and deeper when you run
- Athletes tend to have big lungs
- Smokers often cannot run as fast as non-smokers.
- If you are fit, your breathing rate returns to normal quickly after exercise.



# Who is the happiest?



Happiness is a choice

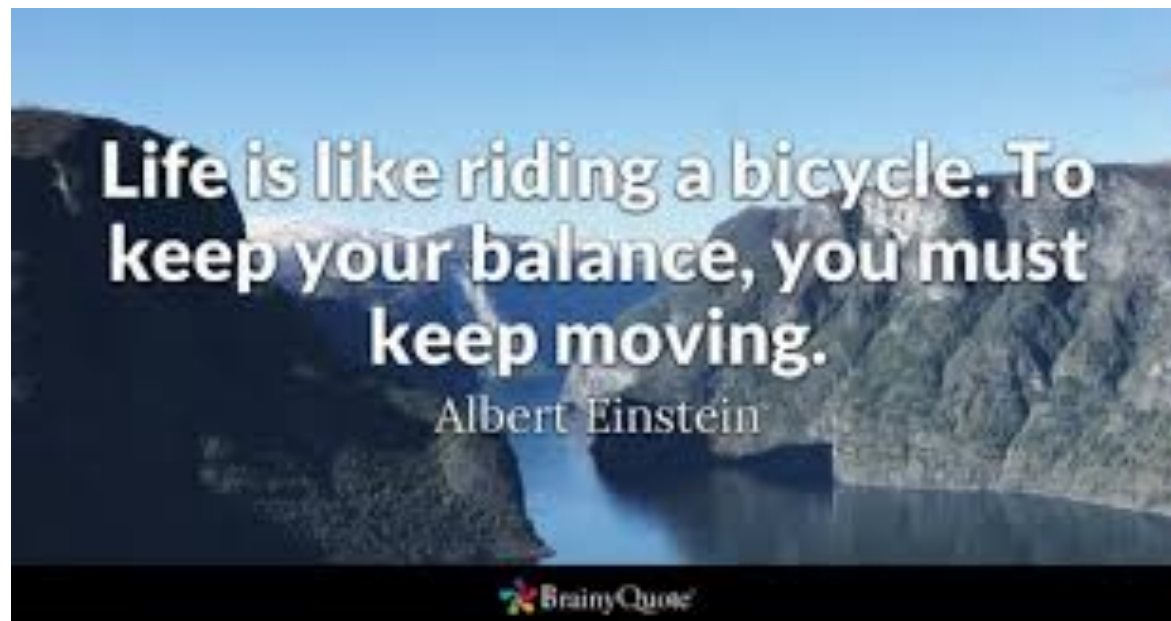
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# How much physical activity?

- At **least 60** minutes or more!



When?

✓ **Everyday!!!**



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# Exercise prescription: Aerobic activity

- 60min of physical activity daily that makes your heart beat fast and causes you to sweat!



# Hippocrates, “Walking is a man’s best medicine?”



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# Exercise prescription: Muscle strengthening activity

- Exercises focused on making muscles strong!  
60min



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# Exercise prescription: Bone strengthening activity

- 60min of physical activity focused on making **STRONG DENSE** bones!!!



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# How does the teacher ensure that the children needs are met?

- Realizing that, although children may vary in ability, each is capable of an individual maximum effort and by encouraging each child to make that effort.



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# P.E is based on the importance of the child as individual!!!



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