

MY STRENGTH IS IN MY BONES

Proposals for educational goals

The students will

- review that our bones are a living tissue constantly renewing themselves
- realize the importance of taking care of our bones
- know what osteoporosis is and its consequences
- find out the main risk factors for osteoporosis and the preventives against it
- know the principles of exercise and weight bearing exercise

Introductory material

Ask students what they know about our bones and why it is important to take care of our bones throughout life.

Osteoporosis is a serious health problem which means that bones can break even by minor accidents or trauma.

Osteoporosis is the condition of the bones when the concentration of calcium decreases to the extent that bones become porous and can no longer cope with normal strain. Osteoporosis is thus expensive for society and the quality of life for individuals is often considerably impaired due to pain, bodily deformation, restricted mobility and reduced ability to participate in everyday activities, e.g. to dress, clean oneself and generally participating in social life due to the fear of fracturing a bone again.

Most popular snacks such as chips, biscuits, sweets and soft drinks are usually rich in fat and poor in vitamins and minerals which are necessary for our bones. It is therefore important to eat diverse food from all the food groups and be sure to take the recommended daily dose of calcium and vitamin D.

Slide: This is what our bones look like

Our bones are a living tissue whose strength is largely subject to the concentration of calcium. Bones begin to form in the fetus stage and are fully developed by our mid-thirties. Within our bones, there is constant decomposition and reformation, i.e. bones are constantly renewing themselves. This process is considerably faster

in our youth than when we are grown up.

Slide: What is a sick bone?

A bone which has become very porous can easily break. The picture shows an obvious difference in a healthy bone and a bone which has been subject to osteoporosis and can no longer withstand normal strain.

Slide: Let's take care of our bones

Bone density (maximum bone density) tells us the concentration of calcium in our bones. The denser the bones are, the stronger they are. Bone density can be measured by special equipment, such as DEXA, X-rays or sound waves.

Osteoporosis intensifies with age, especially in women after menopause. Everyone, both men and women, is subject to osteoporosis later in life.

Slide: The most common places of fracture

In the slide, review the names of our main bones. The most common fractures occur in three bones: Forearm, just above the wrist, the neck of the femur (the hip) and the vertebrae, i.e. these bones can collapse resulting in reduced body height and a stooped posture.

The idea of depositing into our bone bank in our youth for us to withdraw in our later years must be discussed.

What causes osteoporosis?

The following factors are the most likely to cause osteoporosis:

- Inadequate intake of calcium. The recommended dose is 1200 mg during puberty.
- Inadequate exercise, motion/effort.
- Petite bone structure.
- Gender (3 to 4 times more common in women).
- Heredity. A family history of bone fractures due to minor trauma.
- Smoking.
- Excessive use of alcohol.
- Excessive consumption of caffeine.
- Medicines. Some can cause osteoporosis.

Slide: Is inactivity dangerous?



The main preventive measures against osteoporosis are **wholesome food** and **bodily exercise**. Children and teenagers can strengthen their bones by eating food rich in calcium and vitamin D which helps the body to absorb calcium.

Weight bearing exercises help us to increase the density of our bones (the bone mass). These are exercises where we work against gravity, e.g. walking, jogging and all kinds of physical training. Bodily exercises strengthen muscles and bones and improve our balance, thus reducing the risk of falling.

There are many teenagers who hardly do any exercise and instead sit for long hours in front of a computer or a TV. In the long run, this can prove dangerous!

Anorexia is a serious problem, especially amongst teenage girls. The disease leads to malnutrition and thus the body does not receive adequate calcium. This can lead to a disruption (imbalance) of the hormone activities which has a negative influence on bone development. If menstruation stops for 12 consecutive months or more, the risk of osteoporosis increases. This however, does not materialise until later in life.

Assignments

- The first assignment is to register motion/inactivity during one week (on an assignment paper called: Healthy motion). The purpose is to review the extent of their motions/exercises, whether they move enough and whether the particular motions involve weight bearing exercises. The conclusions will be published in the form of a graph (time spent on motion each day); a mean value, frequency, median and other factors, relevant to the mathematical knowledge of the age group involved, can be calculated.

As criteria for how difficult the individual movements are, the following categories may be used:

Light = inactivity, e.g. when we sit in the classroom, in front of the computer or the television or when we are just hanging around.

Medium = includes motion like walking, swimming, cycling and playing without too much strain on the body.

Difficult = includes motion like jogging/running, cross country skiing and other sports such as aerobics or other exercises straining the body and making it sweat.

- Next, the students will categorise a few factors as either

bone-breakers or those that build up bones (on the assignment paper called: Bone-breakers).

- The third assignment is a picture of a skeleton (the assignment is called: Your inner self) where students are asked to mark (in red) what the main bones are called and the most common places of fracture.
- Where possible, it is useful for the student to use the website of Beinvernd (www.beinvernd.is) and take an osteoporosis risk test.

Process

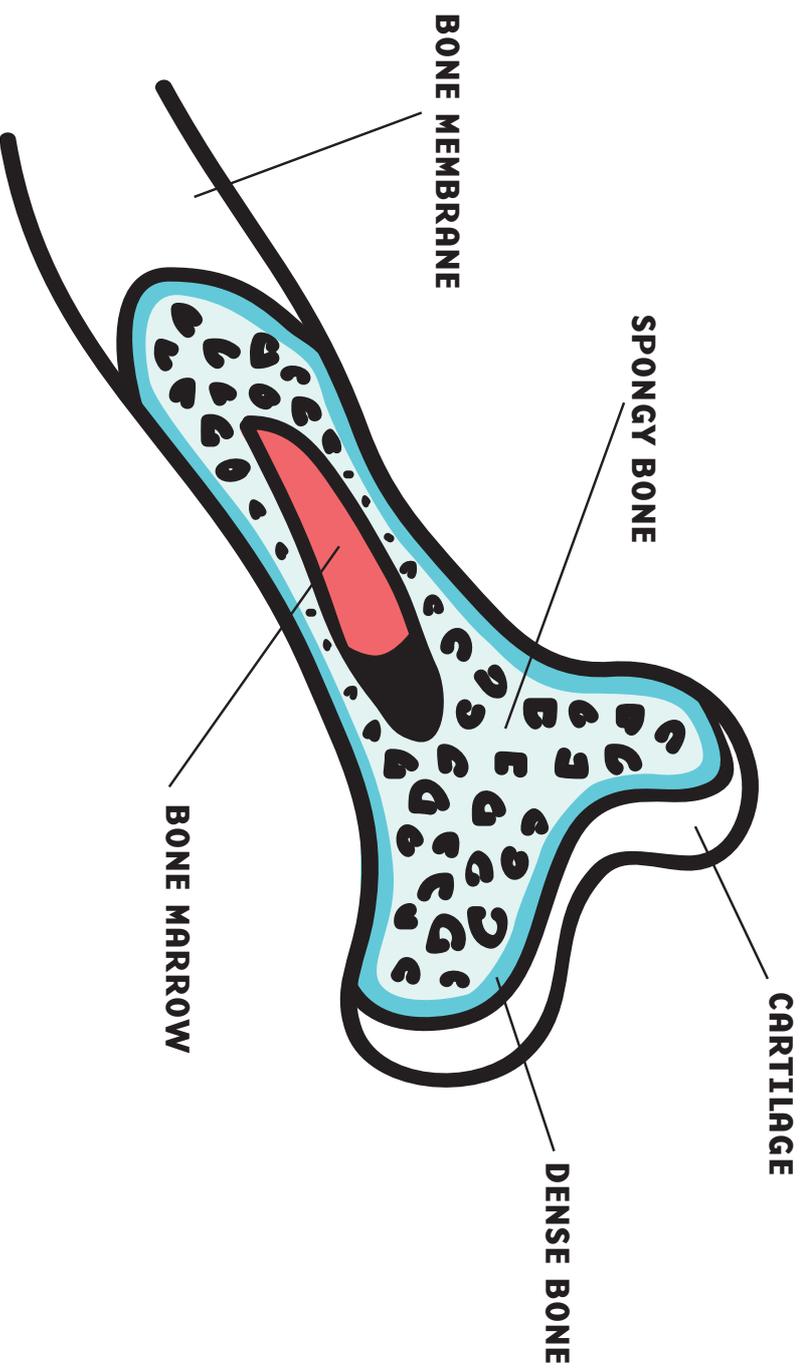
- The students examine their conclusions concerning motion and reflect on whether the conclusions disclose any difference with regard to gender, interests or something else. Are they getting enough exercise to strengthen their bones?
- Discuss whether they are receiving enough calcium, i.e. do they drink milk or eat or drink other dairy products as well as green vegetables. Do they take cod-liver oil and/or vitamin D? Are they getting enough nutritious food each day? They might be reminded of the food circle which is a good aid for remembering all necessary food groups.

Useful websites

- www.beinvernd.is
- www.ms.is (click Hollusta)
- www.netdokter.is (choose Sjukdomar and then B for osteoporosis)
- www.skyr.is/naering_heilsa.html
- www.manneldi.is

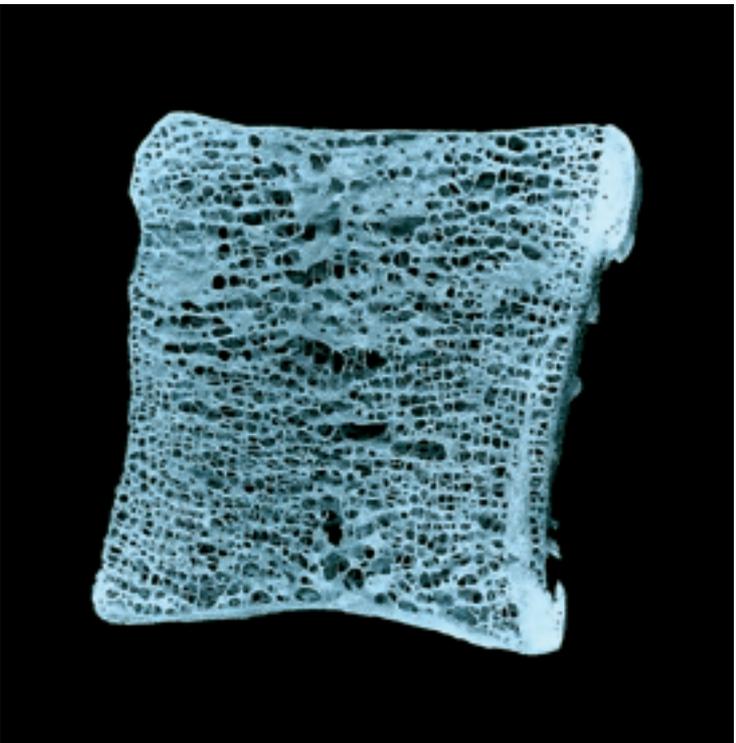
My strength is in my bones

THESE ARE OUR BONES

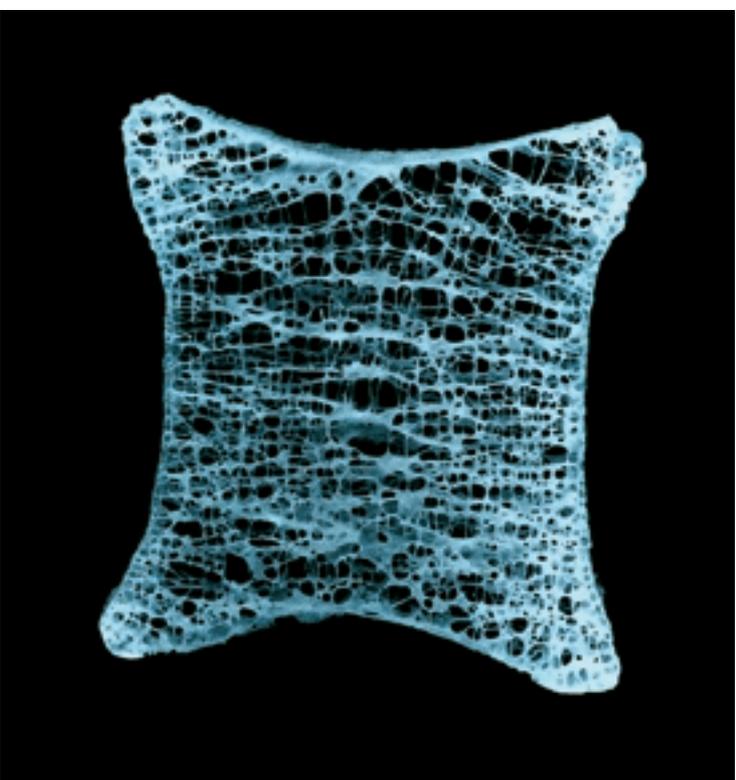


My strength is in my bones

WHAT IS A SICK BONE?



A HEALTHY BONE

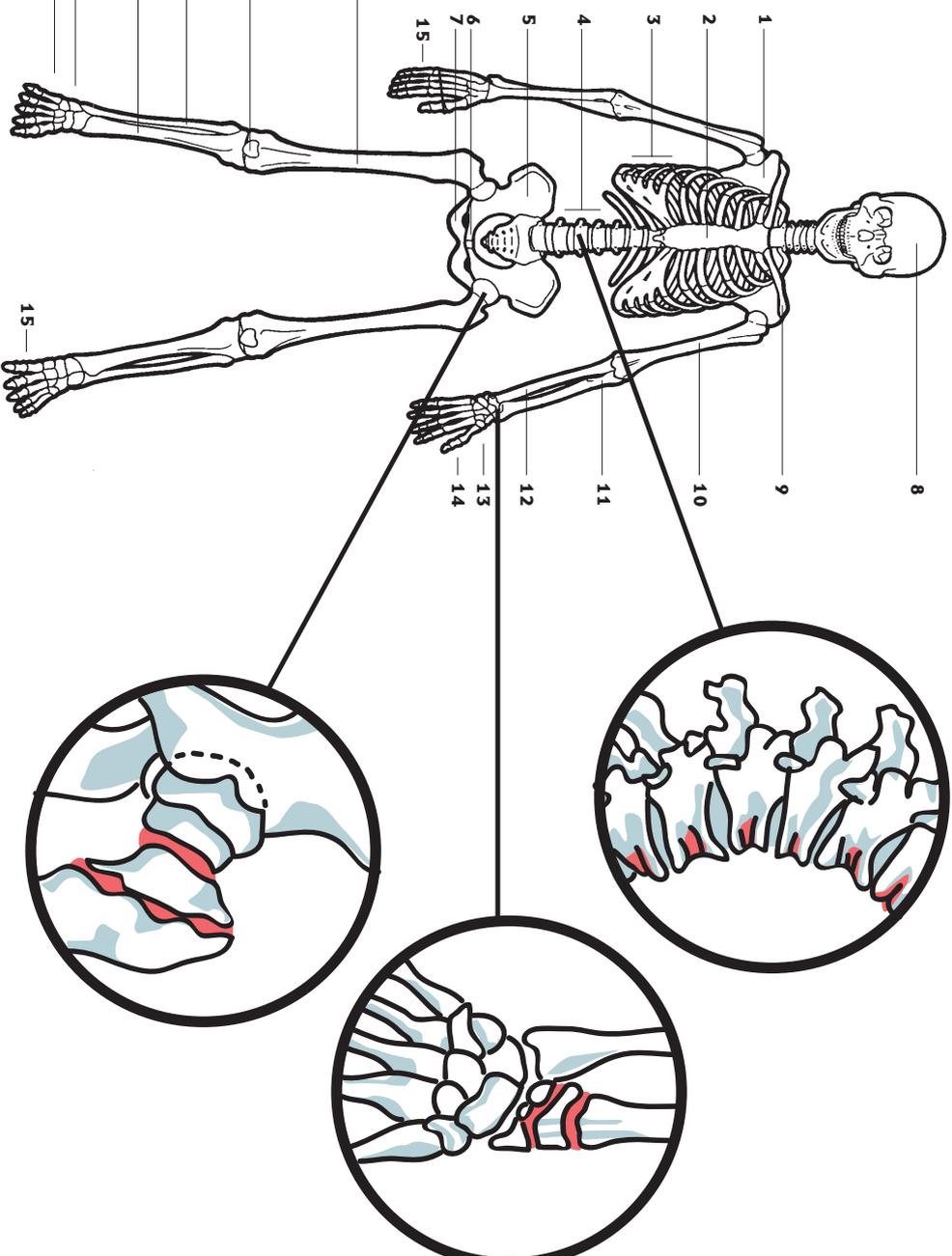


A SICK BONE

My strength is in my bones

THE MOST COMMON PLACES OF BONE FRACTURES

1. Shoulder blade
2. Breast bone
3. Ribs
4. Vertebrae
5. Pelvis
6. Pubic bone
7. Ischium
8. Skull
9. Clavicle (collarbone)
10. Humerus (upper arm)
11. Radius
12. Ulna
13. Carpals (wrist bones)
14. Metacarpals
15. Knuckle bones
16. Femur (thigh bone)
17. Patella (kneecaps)
18. Fibula
19. Tibia
20. Tarsal bones
21. Metatarsals

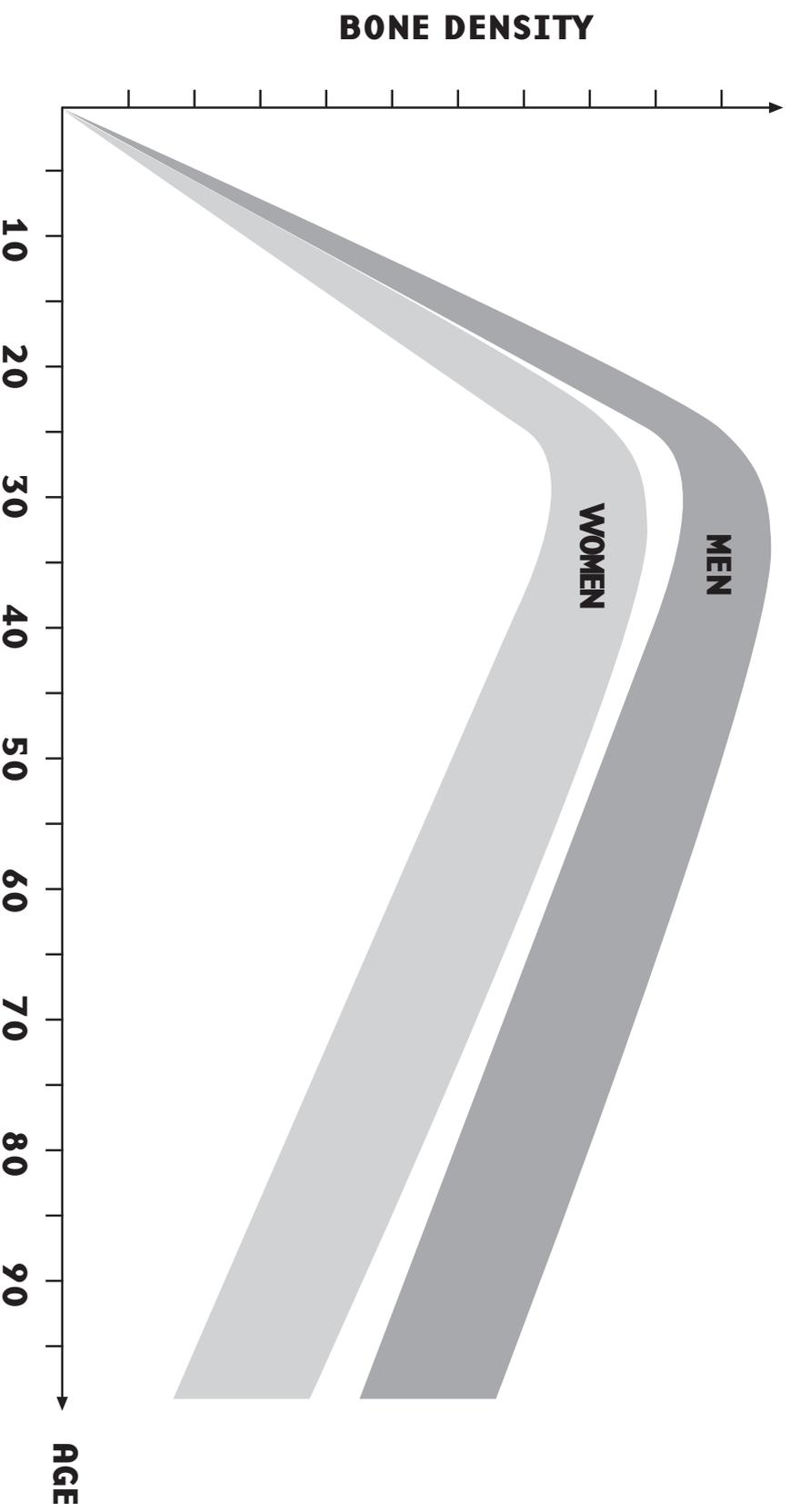


I AM What I CHOOSE!

9th grade

My strength is in my bones

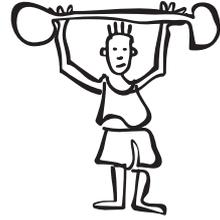
LET'S TAKE CARE OF OUR BONES



My strength is in my bones

I am what I choose!

9th grade



WHOLESOME MOTION

m/s = motion or sitting still (check either)

DAY:	WHAT WAS DONE?	M/S	FOR HOW LONG?	WHAT WAS EATEN DURING THIS TIME?
EXAMPLE:	watched a video tape with friends	S	2 hours	snacks and colas
	went for a walk	M	30 minutes	nothing
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				
Saturday				
Sunday				

My strength is in my bones

I AM WHAT I CHOOSE!

9th grade



BONE BREAKERS

I AM WHAT I CHOOSE, LET'S AVOID BONE BREAKERS

Study the words in the middle column

Which of them could stand for a bone breaker and which for the building up of bones?

BUILDS UP THE BONES	WHAT AM I?	BONE BREAKER
	Alcohol	
	Anorexia	
	Caffeine	
	Calcium	
	Calcium-added foods	
	Cheese	
	D-vitamin added milk	
	Estrogen	
	Falling	
	Green vegetables	
	Jumping rope	
	Potato chips	
	Slipping on ice	
	Smoking	
	Soft drinks	
	Sunshine	
	Sweets	
	Yoghurt	
	Zero gravity	



YOUR INNER PERSON

- | | |
|------------------------------|-------------------------------|
| vertebrae | ischium |
| ribs | tibia |
| knuckle bones | clavicle (collar bone) |
| shoulder blade | tarsal bones |
| radius | upper arm |
| patella (kneecap) | metatarsals |
| femur (upper leg) | ulna |
| fibula | pelvis |
| sternum (breast bone) | carpals (wrist bones) |
| skull | metacarpals |
| | pubic bone |

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