



## SKELETAL CHANGES IN OSTEOPOROSIS

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### ABSTRACT

Summary of the current data on skeletal changes in osteoporosis and their presentation in an accessible form to the participants in the study of the project. Material and methods: Overview on the available literature. Results: A scheme for molecular changes in the skeleton in osteoporosis, as well as a figure with macroscopic changes. Conclusions: Promotion with appropriate materials on the topic can lead to an improvement in the prevention of osteoporosis. The understanding of the intimate mechanisms of the disease leads improve the kinesiological programs and produce new ones. Self-awareness of the patient is important for his active behaviour in preservation of his own health. The schemes are suitable for use with existing self-questionnaires and give information that is more detailed. Acknowledgment: This overview article is related to a scientific project of a medical college on the topic: Elaboration of a preventive program to improve the quality of life of persons at risk of disease from osteoporosis.

**Keywords:** Osteoporosis, prevention, skeleton

This review article is related to the scientific project of Stara Zagora Medical College for 2018 on the topic: Developing a preventive program for improving the quality of life of individuals at risk of osteoporosis. Guidelines recommend screening for osteoporosis with bone mineral density testing in menopausal women, especially those with additional risk factors for fracture. Many eligible women remain unscreened and this project would promote health awareness and improve screening in Stara Zagora district. A single outreach phone call improves rates of BMD screening among high-risk women age 50-64 (1), and with this project we aim to outreach even more people.

**Aim:** To summarize current data on skeletal changes in osteoporosis and present it in an accessible form to the participants in the study project.

Materials and methods: A review of available literature. Computer graphics made by Corel Draw.

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### RESULTS

A scheme of molecular changes in the skeleton in osteoporosis was developed (2). Osteoporosis is a complex disorder characterized by an imbalance of the remodeling process of the bone, which is governed by complex interactions between various hormones, cytokines and its own regulatory system (3). This imbalance results in decreased bone density, which manifests as fractures. The targets for osteoporosis treatment response are different processes in the bone remodeling cycle (4) (**Figure 1**).

A scheme was developed with macroscopic changes. The most common places for fractures are the spine (5, 6) and the femur neck (7). Cases of fractures and other places such as the wrist, ankle, pelvis and proximal extremity of the shoulder bone are also becoming more frequent (8). Panoramic imaging of the jaws may also have diagnostic value in evaluating osteoporosis (9) (**Figure 2**).

All the information is systematized as a poster for informing the participants in the study, and presented as a poster at the scientific conference of the Bulgarian Anatomical Society 2018, held at the Stara Zagora Mineral Baths.

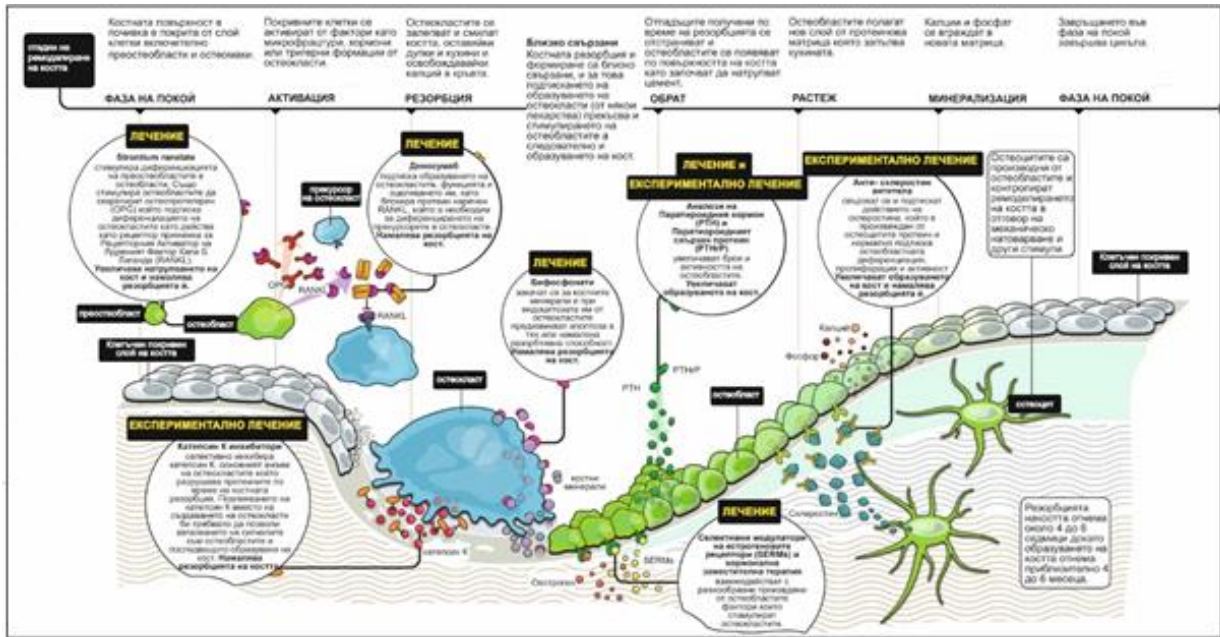


Figure 1. Microscopic changes in osteoporosis



Figure 2. Macroscopic changes in osteoporosis

The main therapeutic options (10, 11) are listed (Figure 3).

<p>Diet: Rich in calcium and magnesium with the necessary vit. D.</p>	<p>Physical Activity: Regular exercise using gravity.</p>	<p>Lifestyle: restricting alcohol, smoking and coffee</p> <p>www.uni-sz.bg/truni9/</p>	<p>Bisphosphonates: first choice, (generic), alendronate, risedronate, ibandronate, zoledronate</p>	<p>Denosumab: second line, human monoclonal antibodies</p> <p>Strontium ranelate: restricted to osteoporosis only where oral administration is not possible. Patients should avoid eating 2 hours before and after</p>	<p>SERMs, raloxifene: second line</p> <p>Parathyroid hormone analogue: restricted to very high-risk patients, especially for vertebral fractures.</p>	<p>Anti-sclerostin antibodies, romosozumab: clinical trial phase</p> <p>Synthetic parathyroid hormone-bound protein: clinical trial phase</p> <p>Cathepsin K inhibitor: phase of clinical trial discontinued due to high risk of stroke</p>
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Figure 3. Therapeutic options on osteoporosis

**DISCUSSION**

Osteoporosis causes more than 8.9 million fractures a year in the world, making one every 3 seconds. The disease affects over 200 million women worldwide, approximately one in ten over 60, one in 5 over 70, 2 in 5 over 80, and 2/3 of those over 90 (12). In Bulgaria, over 1 million people have low bone density (200 thousand with osteoporosis and 800 thousand

with osteopenia). This represents 55% of the population of Bulgaria over 50 years of age. Approximately 33% of patients with a femoral fracture are unable to live independently in the following year, with a mortality rate of 20%, mostly due to comorbidity (13). Licensed osteoporosis treatment reduces the risk of fractures, but is associated with various side effects and the benefits should be weighed

carefully in each patient (14). Several new drugs are in the process of testing. Online-based questionnaires could be a valuable tool in health promotion and prophylaxis of osteoporosis (15).

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