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TECHNIQUE OF EARLY DIAGNOSTICS OF THE OSTEOPOROSIS

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The osteoporosis is a widespread medical problem and covers all population, irrespective of a sex, develops without symptoms throughout decades, demonstrating fractures after an insignificant trauma. Preventive maintenance osteoporotic fractures which are the main reason of disease, physical inabilities and death rates, is possible and necessary. For today a densitometry − a unique authentic way of diagnostics of an osteoporosis at an early stage when disease gives in to treatment.

Keywords: an osteoporosis, fractures, disability, early diagnostics of an osteoporosis, a densitometry, rheumatologic center, diagnostics, treatment and prophylaxis consulting-room.

Introduction. The first decade of the XXI-st century proclaimed World Health Organization (WHO) on the International Decade of Bones and Joints (The Bone and Joint Decade 2000-2010), starting in January, 2000 in Geneva comes to the end. Attraction of attention of the wide public worldwide to the patients, suffering rheumatic diseases, for improvement of quality of life and saving of health of these persons was the purpose of Decade.

In 1994 the WHO officially recognized and has defined an osteoporosis (OP) as system disease of a skeleton from group of metabolic osteopathy which is characterized by reduction of bone weight and disorders of a bone tissue microarchitechtonics that leads to decrease in durability and increase of risk of occurrence of fractures. In the International classification of illnesses OP it is carried in XIII statistical class of illnesses of osteo-muscular system and a connective tissue [1].

The initiative of carrying out of Decade has supported more than 750 professional medical organizations and societies of patients, the WHO and the United Nations. The secretary general of the United Nations mister Kofi Annan in the message to opening of Decade has underlined that already now there are effective ways of preventive maintenance and treatment of disabiling conditions, including from the osteo-muscular device, therefore has ripened necessity actively to realize them.

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The idea of Bones and Joints Decade was based 2000-2010 on success of Decade of the Brain 1990-2000 which has drawn attention of the public and has raised support of researches, especially at Alzheimer's disease, as well as on success the last decade Declarations the Sant-Vinsent which has appeared effective concerning increase of standards of the help to diabetics.

Following problems of Decade have been defined: comprehension by a society of sufferings and the price of joint-skeletal infringements; possibility for patients to participate in the decision-making, concerning their health; comprehension by a society of necessity of improvement of

preventive maintenance and treatment by carrying out of scientific researches. The basic illnesses in which relation within the limits of a Decade work has been spent: illnesses of joints, OP, a pathology in the field of a backbone, a serious trauma of extremities, children's muscular-skeletal infringements

Decade was based on the multidisciplinary initiative involving in the activity any who is ready to help with perfection of methods of preventive maintenance and treatment, including workers of public health services, scientists, patients and, especially, politicians. So, known women-politicians and public persons − the Queen Sofia, Queen Ranija, Valentina Matvienko became patronesses of National societies on preventive maintenance OP, etc.

In 2006 at the initiative of the Russian association on OP one-stage multicenter inter-regional research with participation of doctors of a practical link of public health services within the limits of the program «Northern star» in which doctors from 30 cities of Russia have taken part has been conducted. During this period schools for patients OP have started to work, seminars for doctors of various specialties were held, hospitals began to be equipped with densitometers [2]. Thanks to the actions spent within the limits of Decade, and inhabitants PC () had a possibility to pass early diagnostics OP.

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Prevalence of an osteoporosis and its consequence

By data the CART, among noninfectious diseases OP takes the fourth place after illnesses of cardiovascular system, an oncological pathology and diabetes. OP is a principal cause of crises of a neck of the hip, often meeting at women is more senior 65 years. ОП, causing the considerable sufferings, leading to physical inability, became extremely important social and economic problem.

According to WHO`s criteria, from 13 to 18 % of women at the age from 50 years also is more senior have ОП and from 37 to 50 % low bone weight. Prevalence of this disease in the world increases constantly and estimated on the scales as global epidemic. 40 % of women and 12 % of men have real risk of development of this disease. Growth of number of patients with OP is promoted by modern style of life (intensive diets for fast weight reduction, an inactive way of life), life expectancy increase.

Among persons everyone is more senior 50 years 10th has the crisis of a vertebra everyone 200th − fractures of distal part of a forearm, everyone 1000 − fractures of a hip`s neck. Researches show that in 10-15 years after approach of a menopause at 30-40 % of women develops OP, and at persons it is more senior 70 years is defined more than in 70 % of cases. It means that every second woman and every eighth man will have OP. Therefore, if today not to accept preventive maintenance effective measures, through some tens years frequency osteoporotic fractures can reach epidemic scales. After fracture of a neck of a hip of 30 % of patients become invalids of 1 and 2 groups, loading on the country budget is available.

In the USA death rate at hip factures makes 4-11,5 %. At patients with hip crisis in houses on leaving death rate for 3 months reached 23 %, in comparison with 10,5 % at the persons who did not have crises. In Belarus almost 130 thousand persons annually suffer from the fractures connected with OP. More often such patients need special leaving and expensive medicines. Complications of OP – a serious problem from the economic point of view [8].

First of all, at women in a postmenopausal vertebras, femoral and beam bones are surprised. In these bones also arise osteoporotic fractures. As examples serve: fractures of a beam bone in a typical place; compressive fractures of bodies of vertebras therefore at women in a postmenopause (sometimes growth decreases for 7-8 sm.) and fractures of a neck of a hip which represents the greatest health hazard. So, the lethality within the first year after such crisis in various cities of Russia fluctuated from 30,8 % to 35,1 %, and from the survived 78 %, after a year, and 65,5 % after two years need a permanent care. It is established that at postmenopausal OP similar changes occur and in the top and bottom jaw, result of that is occurrence of various diseases of an oral cavity and, as consequence, loss of teeth [4].

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Frequency of OP last decades constantly increases. At densitometry of persons the WHO is more senior 50 years, according to criteria, the osteoporosis in Russia is revealed at 30,5-33,1 % of women and 22,8-24,1 % of men. One of three women and one of five men of this age group have OP.

It is considered that risk to be ill OP at men approximately three times more low, than at women. Risk factors of development of an osteoporosis at men: a low index of weight of a body, smoking, hereditary predisposition to OP, alcoholism, absence of physical activity, a lack of calcium of an organism. The probability of crises of bones of a coxofemoral joint at men in the countries of Europe makes from 13 to 25 %, and prevalence of crises of bodies of vertebras is identical at men and at women. In Great Britain, for example, it makes 12 % at men and 10 % − at women. Epidemiology of OP among men in Asia the urban saturation in the state differs from the country to the country, and, than above, is especially extended in it «man's» OP. For example, frequency of crises of bones of a coxofemoral joint at the men-Chineses living in Hong Kong, on 70 % above, than at inhabitants of Thailand. At Chineses of Hong Kong frequency of ractures of bones of coxofemoral structure made approximately 5 cases on 1000 elderly men and 8 cases on 1000 elderly women, and prevalence of crises of bodies of vertebras made 17 % at men and 30 % at women [6].

Unfortunately, for today there is no statistical data about prevalence OP in Republic Sakha (Yakutia). Crises without instructions of the reason which have led to loss of mineral density of a bone tissue (BMD) are considered only, frequently OP is diagnosed casually – in X-ray pictures crises of vertebras or wrist bones are found out.

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Diagnostics of OP

• X-Ray. Roengenologically to diagnose osteopenia and initial displays of an osteoporosis it is impossible, as loss less than 25-30 % of bone weight on roentgenograms isn't visible. This method matters for diagnostics of fractures.

• Quantitative definitions of BMD. The X-ray densitometers, allowing to make the objective diagnosis of an osteoporosis, to define to osteopenia, are presented by two types of devices:

- Two-power x-ray densitometers (DXA) the axial.
- The peripheral scanners of system DHA estimating BMD of beam bones;

• DXL densitometers work on technology which has applied for the first time three-componental model of fabrics.

• the Quantitative computer tomography. The estimation of a macrostructure of a bone is spent.

• Ultrasonic diagnostics (density densitometry). Devices at which help probably only to allocate group of the raised risk on the first screening stages of research [3].

The technique of a bone density densitometry is based on a principle of absorption (absorption) by a bone fabric of the photons radiated by a X-ray tube, in the quantity proportional to the maintenance of calcium in a bone. Numerical value of this indicator turns out by calculation of a difference of quantity of the photons entering into the investigated part of a bone fabric and leaving it. Soft fabrics also absorb a quantity of photons in this connection each of listed above technologies uses various methods for calculation of number of the photons absorbed by soft fabrics.

At carrying out two-power x-ray absorbtiometry (DXA) use two bunches of X-rays of high and low energy. The known difference in degree of absorption of these X-rays between a bone fabric and soft fabrics allows to calculate BMD (after the amendment made taking into account absorption of photons by soft fabrics). This technology allows to receive indicators BMD very much split-hair accuracy. To exclude from results of research influence of soft fabrics allows to use possibilities of this technology DXA at measurement of BMD in the central sites of a skeleton: in lumbar department of a backbone and in a femur (including a neck of a hip and the

big spit). These sites represent the greatest interest for clinical physicians since in them there are the heaviest crises more often.

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Besides, many of these devices are supplied by the program «all body», allowing to define the maintenance of minerals in all skeleton, and also muscular weight and a fatty fabric. Now systems DXA are most widely used in clinical practice and are the most studied and popular systems in the world. In new updatings of devices DXA there is a possibility of lateral scanning and morphometry measurements of vertebras that considerably raises информативность this method. The patient during research lays down on the special table, as a rule dressed, and the special device ("hand") moves around its bodies.

Peripheral two-power x-ray absorbtiometry (pDXA). Rather recently technology DXA has been adapted for an estimation of condition МПКТ in the field of peripheral sites of a skeleton, in particular, in the field of a forearm, and also a forearm and a calcaneal bone. This technology allows to create the image proximal and distal sites of beam and elbow bones of the same type and quality, as well as the images created by means of DXA, and also higher throughput, in comparison with DXA.

Densitometers are subdivided on stationary, allowing to scan an axial skeleton, and portable with which help it is possible to receive representation about BMD extremities. Both models have the advantages as can be used in various premises. Portable win, of course, in cost and in possibility of inspection of patients with the limited possibilities, and also for screening BMD of inhabitants in villages (fig. 1).

Beam loading at densitometry research so low that the device doesn't demand a special premise. The density densitometry allows to define BMD and to predict risk of development of crises. This research plays an important role in revealing OP an early stage when crises still aren't present. For today a density densitometry − a unique, authentic way of diagnostics OP at an early stage when disease gives in to treatment. This technology is successfully used in Europe, the North America, China and Japan [7].

The density densitometry is shown following groups of patients: to women at the age of 65 years also is more senior; to women in a postmenopause 65 years in the presence of risk factors are younger; to men at the age of 70 years also is more senior; to adult persons with osteoporotic fractures; in the presence of diseases or the conditions accompanied by decrease of bone weight; to all persons accepting therapy, iatrogenic concerning loss of weight of a bone; to all patients accepting antiosteoporotic treatment for an estimation of its efficiency; to all persons who yet weren't accepting treatments but by whom it can be demanded at decrease BMD.

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Skeleton sites to which measurements are spent:

• a backbone in a back-forward projection and proximal departments of a femur (for stationary densitometers);

• a forearm in following cases: impossibility of a density densitometry of a hip and-or a backbone or interpretation of its results; presence hyperparathyroidism; the expressed surplus of weight of a body.

As a result of inspection the patient receives the digital image of the high permission and the conclusion containing quantitative characteristics, confirming or denying diagnosis OP, and also evident color listing with the schedule of age changes BMD (fig. 2 and,).

In modern clinical practice individual BMD it is compared with reference a database. Because of various methods of measurement, depending on the various equipment, the most comprehensible way of estimation BMD – an estimation with use T - and Z - criteria [4] (tab. 1, 2).

The mass researches directed on diagnostics OP and control of efficiency of applied treatment are conducted. Early diagnostics OP is a guarantee of its successful treatment. Bone densitometers in Russia are used since 1991.

Materials and research methods. The summer of 2009 (from May till September) in Yakutsk for the first time spends the unique action. Pharmaceutical company Nycomed had been gave x-ray densitometer DTX-200, the USA. All interested persons could define BMD free of charge.

In total 3784 townsmen and villages are surveyed. Prevailing age surveyed – 50-60 years (fig. 3.). Patients for whom the T-criterion (basically has been defined, surveyed is more senior 50 years) there were 2649 people. At 1457 (55 %) is defined normal BMD, at 662 (25 %) – osteopenia, at 530 (20 %) - OP. At analysis BMD on age groups the following data (fig. 4) is obtained.

Results and discussion. Regretfully it is necessary to ascertain that already at the age of 40-50 years it is marked ОП, according to a density densitometry (6 %). At inquiry these surveyed didn't show complaints, didn't feel discomfort. Certainly, in more senior age groups the natural tendency to decrease BMD is marked.

Similar screening of the population on OP has been spent in Omsk (all 1726 people), in Surgut (650), in Krasnoyarsk (1760), in Nefteyugansk (3852), in Berezniki (2296) are surveyed, to Ulan-Ude (3807) (fig. 5). The Fig. 6 displays share ОП among the population of the surveyed cities. It is interesting to notice that in Yakutsk, Ulan-Ude and Nefteyugansk the comparable number of inhabitants is surveyed, and among yakutian OP came to light more often. In the subsequent it is necessary to analyze carefully cases OP, especially at persons of young age. To conduct corresponding researches for careful diagnostics of a cause of illness, to reveal risk factors, to correct a diet and physical activity at the given category of patients.

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On April, 13th, 2010 has occurred significant for rheumatologic services of Republic of Sakha event on the basis of municipal rheumatology center (MRC) the Consulting-room of diagnostics, treatment and osteoporosis preventive maintenance (fig. 7, 8, 9) has opened. The equipment was given by pharmaceutical company Novartis. All interested persons can pass a densitometry in this Consulting-room, receive consultation of the rheumatologist. And for the patients passing hospitalization in Yakut state hospital this procedure is free. Methodical maintenance of work of an office is carried out with support of companies Novartis and Nycomed. In MRC «Osteoporosis Schools» where doctors tell to patients about various aspects of such multilateral problem, as OP are regularly spent.

The conclusion. OP is a widespread medical problem not only at women, but also at men, that is covers all population, irrespective of a sex. In this connection especially important constantly to raise level and diagnostics possibilities, to care of decrease in risk factors, and also to develop new effective preparations. Though osteoporotic fractures are the main reason of disease, physical inability and death rate, their preventive maintenance is possible and necessary.

For today a x-ray density densitometry − a unique authentic way of diagnostics ОП at an early stage when disease gives in to treatment. Now Yakutian have unique possibility to pass densitometry inspection in Yakutsk. Introduction of this technique in hospitals of Yakutsk corresponds to modern requirements for diagnostics and control of therapy OP.

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Tab. 1.
Interpretation of results at an estimation of indicators BMD at women in a postmenopause, perimenopause and at men at the age of 50 years also is more senior

BMD (T-criterion)	the Diagnosis	Risk of crises
+2 to-1 SD	Norm	Low
1 to – - 2.5 SD	Osteopenia	Moderated
>-2.5 SD	the Osteoporosis	High
>-2.5 SD + crises	the Heavy osteoporosis	very high

The T-criterion represents quantity of standard deviations above or below an average index of peak of bone weight of young women. The T-criterion decreases in parallel with gradual decrease in bone weight at increase in age of surveyed persons.
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Tab. 2
Interpretation of results at an estimation of indicators of mineral density of a bone fabric at women before a menopause and at men is younger than 50 years

BMD (Z-criterion)	the Diagnosis	Risk of crises
+2 to-2 SD	Norm	Low
> - 2.0 SD	Osteopenia	Moderated
>-2.0 SD (presence of crises, risk factors)	the Osteoporosis	High

Z - The criterion represents quantity of standard deviations above or below an average index for persons of similar age. If this indicator is unusually high or low, it can specify in necessity of carrying out of the further analyses
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Fig. 1. X-ray absorbtiometry (DXA). A density densitometry of bones of a forearm.
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Fig. 2. And. Densitogramm of women of 57 years (age more than 50 years, a menopause from 44 years look at T-criterion). The conclusion: bone weight at the given patient in norm (T-0,2).
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Fig. 2. Densitogramm of young men of 18 years (we look at Z-criterion). The conclusion: decrease in bone weight, in comparison with age norm (Z-criterion-2,2). It is known that last year, having jumped off from a horizontal bar, the young man has received clavicle crisis. It is recommended to spend additional examination.
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Fig. 3. Age surveyed on a densitometer in 2009.
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Fig. 4. Mineral density of a bone fabric in different age groups (Yakutsk, 2009).
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Fig. 5. Mineral density of a bone tissue of the patients who have passed a density densitometry in different cities.

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Fig. 6. OP among surveyed according to a density densitometry in different regions.

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Fig. 7. Solemn opening of an office of diagnostics, treatment and preventive maintenance of an osteoporosis on the basis of MRC of Yakut State Hospital on April, 13th, 2010. Head of MRC Markova O. G, and honored guests from Irkutsk (on the right − the senior medical representative of pharmaceutical company Novartis of Eugenia Miller).

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Fig. 8. A salutatory speech of main traumatologist of Far East Federal Region, Ph.D., Professor Palshin G. A.

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Fig. 9. At densitometry carrying out it is necessary to know growth and weight of the patient. Scales − gifts from company Nycomed − are handed over by medical representative Zabela T.D.

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THE NEW ENDOSCOPIC VARIANT OF NEFROPEXY.

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Surgical treatment of nephroptosis remains one of the most pressing problems in modern urology. This is due to the prevalence of disease which has 6,2% in the population of the patients with urological diseases and nearly 18,4% in the population of the patients with pathology of kidneys, as well as with high social importance of the disease. The basic treatment mode of nephroptosis and its complications is an operative intervention.

At present more than 300 variants of surgical treatment of nephroptosis are known and a search of new modifications of operations lasts, it depends on the dissatisfaction with the late fate of the existent treatment methods of the surgery treatment, a rather high percent of relapses of the disease and the existence of the postoperative complications. Some of the operations widely used previously, became unpopular among the clinicians because they are not physiologic and uneffective. Widespread methods of nephropexy both open and endosurgical have little in common with gentle attitude toward perirenal space. They are peformed with the wide dissection of the fascial-fatty renal capsule, that in turn injures and destroys suspensor structures providing normal anatomic structure of the kidney and physiologic mobility of the organ.

With introdaction of the endovideosurgery operations in the clinical practice an important gentle type of the operative intervention was reached. The next point was to study the main blood flow in the vessels of the kidney and the degree of normalization after nephropexy as one of the leading units, which requires correction at nephroptosis.