

KINETIC AND PROPHYLACTIC TREATMENT OF OSTEOPOROSIS ON YOUNG ADULTS

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Abstract

Osteoporosis is a skeletal disorder characterized by its quality degradation due to bone loss. The purpose of the study was to improve the development of early osteoporosis installed to 33 year old patient through physical therapy and hydrokinetotherapy. The diagnosis presented by the patient at the beginning of the kinetic treatment was hypogonadotropic hypogonadism, secondary severe osteoporosis. Kinetic and prophylactic treatment aims at the stagnation of disease progression, decreasing the degree of osteoporosis and social, work and family reintegration. T-score at the lumbar L1-L4 decreased by -0.2 and at the hip it decreased by -0.4 in 6 months and the degree of osteoporosis was decreased by -0.2 at lumbar level, respectively -0.4 at the hip. According to the results the applied kinesiology and hydrokinetotherapy to the patient has stalled and diminished the development of osteoporosis.

Introduction:

One of the fundamental ways underlying rehabilitation of motor deficiencies is physical therapy. Rehabilitation, as a form of medical and social assistance, aims at uniting the therapeutic ideas and their centralization achieving a smoother therapy that has a tonic effect, supporting a normal mental state of the patient.

Kinesiology represents therapy through movement performed by specific recovery programs, which aims to regulate the imbalance present in the body, disorder that can lead to certain diseases.

Hydrokinetotherapy, a branch of physical therapy, including exercises and mobilizations carried out using body immersion, patients

benefiting from the action of the complex mechanical, thermal and chemical factors of water.

Kinetic and hydrokinetic programs of subject's rehabilitation, associated with the use of respiratory gymnastics intend to improve the function of the injured segment or segments and help to a speedy recovery.

Osteoporosis is a skeletal disease characterized by low bone strength caused by the loss of bone mass and bone quality degradation. Therefore, the central element in the pathogenesis of the disease presents decreasing bone strength and the fracture risk is influenced besides BMD (bone mineral density) and other factors, on the one hand contributing to increased bone fragility (determinant factors of bone quality) and on the other favoring the traumatic event (balance disorder, psychotropic medication, etc.) [1]

Osteoporosis has a recent worldwide incidence of approximately 40 years and is closely related to other factors such as lack of treatment methods and the lack of modern diagnostic techniques and monitoring of disease. WHO (World Health Organization) expects that in 2020 the number of patients with osteoporosis will reach 1 billion inhabitants, and in the next 25 years the number of people over 65 suffering from osteoporosis will increase by 88%. As the statistics go, in Romania there are about 1 million people annually showing the silent disease or "silent thief" as osteoporosis is called.[2]

Over the years the osteoporosis phenomenon is increasingly common among young adults. Osteoporotic fractures arise because of lack of physical activity, the absence of specific diets (intake of Calcium, fruits, vegetables, fish, milk) or the specific causes (endocrine, rheumatologic).[3]

Bone densitometry techniques with biological examinations are specific methods that help assess bone mass and bone metabolism. These laboratory explorations provide information about the bone quality, architecture and mineralization. Dual absorptiometry with X-ray (DEXA - Dual x-ray absorptiometry) represents the updating of the other radiological examinations using the X radiation.

Currently, DXA method is the main technique used in the assessment of osteoporosis. T-score is a core value in patient assessment with DXA. Depending on this score one can determine the degree of installed osteoporosis.[1]

Etiologic classification of osteoporosis includes many osteopaths in which the common factor is the decrease in BMD. Depending on these

factors, osteoporosis is classified into: primary osteoporosis (postmenopausal, age, juvenile idiopathic) and secondary osteoporosis (endocrinopathies, digestive/nutrition diseases, rheumatologic diseases, hematological disorders and other causes.)[3]

Material-method:

The purpose of the study was to identify how kinesiology can improve early osteoporosis installed in a patient aged 33 years. The finality of kinetic treatment is the disease stagnation, social, work and family inclusion.

The role of this scientific research was to verify the assumptions made and to fulfill the objectives set in patient's recovery. The treatment was applied at the patient's home (Tg.Neamț, jud. Neamț) and at The Swimming and Kinesiology Complex from the "Stefan cel Mare" University of Suceava.

The evaluation methods used in order to achieve kinetic treatment were:

- *visual analog scale (VAS)* to assess pain intensity;
- *evaluation test for osteoporosis risk*;
- *evaluating the quality of life in patients with osteoporosis*: it

provides a functional examination of patients with osteoporosis on quality of life [3];

- *adapted HAQ questionnaire* (Health Assessment Questionnaire) represents an assessment of patient's health that measures the degree of pain and functionality in daily activities.

- DXA investigation

The treatment program was divided into 3 stages:

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|-----------|-------------------------------------------------------------------------------------------|
| Stage I | - general and specific affected area relaxation;
- relieving pain by applying posture. |
| Stage II | - preparing the body for effort (warm-up exercises).
- medical gymnastics exercises; |
| Stage III | - swimming and hydrokinotherapy;
- social and professional reintegration. |

The objectives of kinetic treatment were as it follows:

1. Lowering the neck and lumbar pain by applying physical exercise;
2. Increasing the joint amplitude on each movement used;
3. Correct deficient postures and education of the subject on correct postures in daily activities;

4. Increased resistance and muscle strength;
5. Maintaining heart and breathing rate into the normal range.

In the table below are just some kinesiology exercises in the entire recovery program.

Table 1. Kinetic program

Initial position	Exercises
Standing	<ol style="list-style-type: none"> 1) From standing, legs apart, hands on the costal projections breathe in deeply through nose, then press the palms on the chest and breathe out through your mouth. 2) From standing with stick held by the ends, raise arms and breathe out once with a leg extension at the back, return with exhaling. 3) From standing, back against the wall, arms along the body, raise arms bottom up sideways and return; it is kept at all times the contact with the wall. 4) From standing semi-squats for stability.
Supine	<ol style="list-style-type: none"> 1) Supine position, arms along the body breathe, bringing the knees to the chest and abdomen pressed in with the arms, head raised, return exhaling; executed also with the other leg. 2) Supine knees bent and feet flat on the ground. Maintain normal curve of the back - not arching the back. 3) Supine, MS along the body, knees bent, straining abdomen, arising head and upper torso a few centimeters from the ground exhaling, head is maintained (5-6) seconds in line with the neck and trunk, come back exhaling. 4) Supine, arms along the body, breathe while abduction of legs and bringing arms sideways, come back exhaling.[4]
Prone	<ol style="list-style-type: none"> 1) Prone, arms along the body, inhaling, executing trunk extension, return exhaling.
Sitting	<ol style="list-style-type: none"> 1) Seated on a chair with your back straight and your palms on your thighs. Tense the abdominal muscles and look forward. Stretching easily one knee while the heel lifted few centimeters off the ground. Keep your back straight. Maintain the position for a few seconds, breathing

	remains normal. Return to the initial position. This exercise is to be repeated five to ten times with each leg.
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In addition to these exercises, the treatment was completed with hydrokinetotherapy sessions that were held at The Swimming and Kinesiology Complex from the "Stefan cel Mare" University of Suceava.

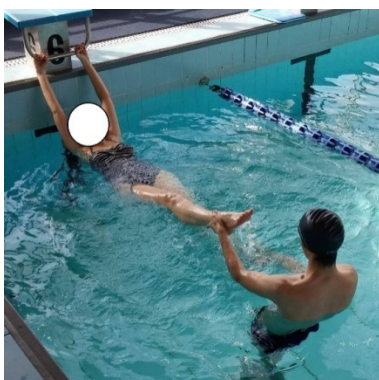


Fig.3 Back floating, support overhead, perform shear movements of legs



Fig.4 Back swimming - learning

Results and discussions:

Before beginning the kinetic and prophylactic treatment, the patient being diagnosed hypogonadotropic hypogonadism conducted a DXA examination on 26th of November 2015 showing at the L1-L4 lumbar spine a T score -2.8 and at the hip a T score -2.2. This result indicates an advanced osteoporosis and a high fracture risk, taking into account the patient's age. Even if the patient is very young for this disease, the installed osteoporosis is type I. She has as etiologic substrate the estrogen deficiency and from this point of view it can be classified among the endocrine osteoporosis.

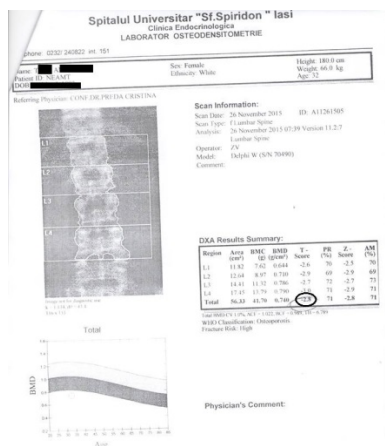


Fig. 1 Initial result of DXA examination– 26.11.2015 (Area of lumbar spine L1-L4) T score -2,8

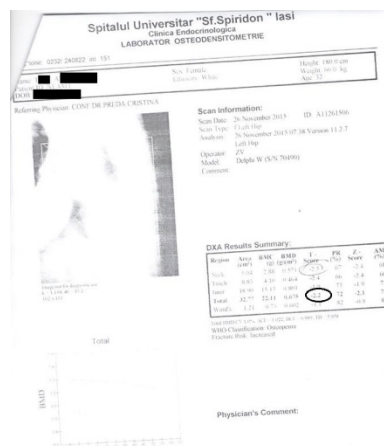


Fig.2 Initial result of DXA examination - 26.11.2015 –Area of femoral neck T score -2,2

Given the fact that until now, the patient used to lower the degree of osteoporosis using medication like Femoston 2 / 10mg (hormone replacement therapy) and Tevanat 70mg, Alpha D3 0.5g (to improve bone layer), I considered using kinesiology and hydrokinetotherapy in order to have quick and visible effects on precocious advanced osteoporosis.

Patient recovery lasted 6 months during 10 January to 30 May 2016.

Frequency of meetings was 1-2 times a week and each session lasted 30 to 60 minutes.

In the first weeks of therapy, we worked easily with the patient, the recovery program not exceeding 30 minutes. For the beginning, the patient was accommodated to the medical gymnastics and it was created the schedule of exercises according to the medical treatment. Gradually, the working time reached 60 minutes, exercises being worked individually.

On 02.06.2016, after having finished the kinetic and prophylactic treatment, the patient T.A. resumed the DXA examination at the Endocrinology Clinic at Sf. Spiridon Hospital in Iasi, observing the following results:

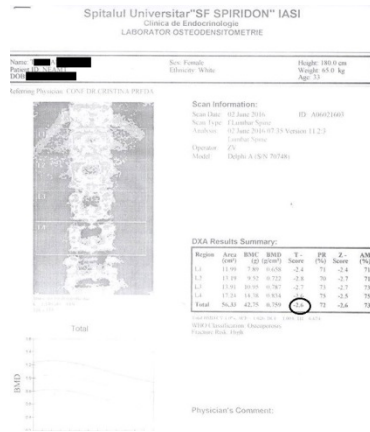


Fig. 5 Final DXA result Lumbar area, T score -2,6

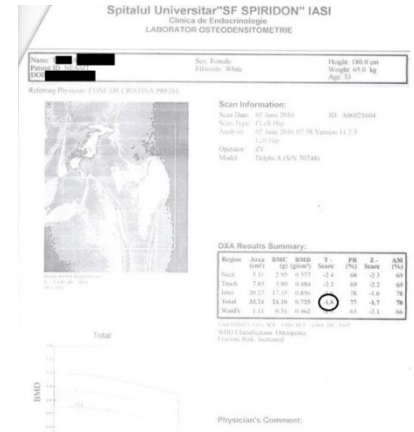
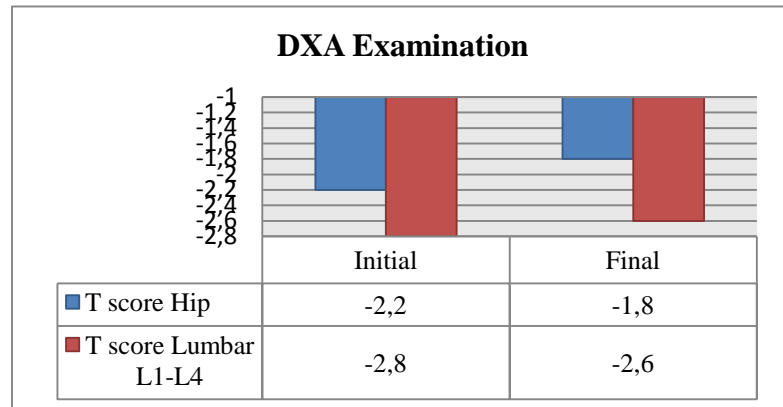
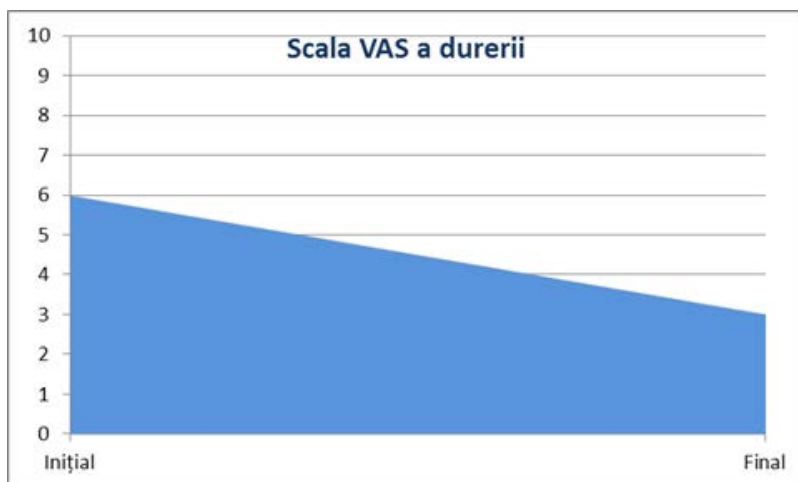


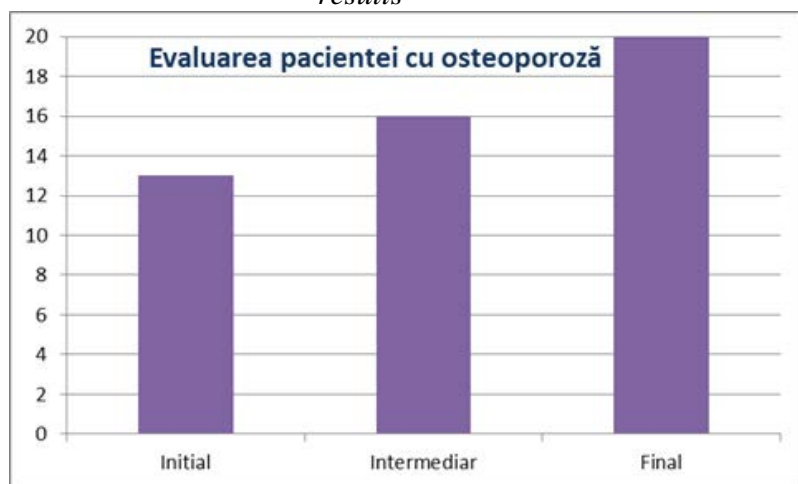
Fig. 6 Final DXA result hip area, Tscore -1,8



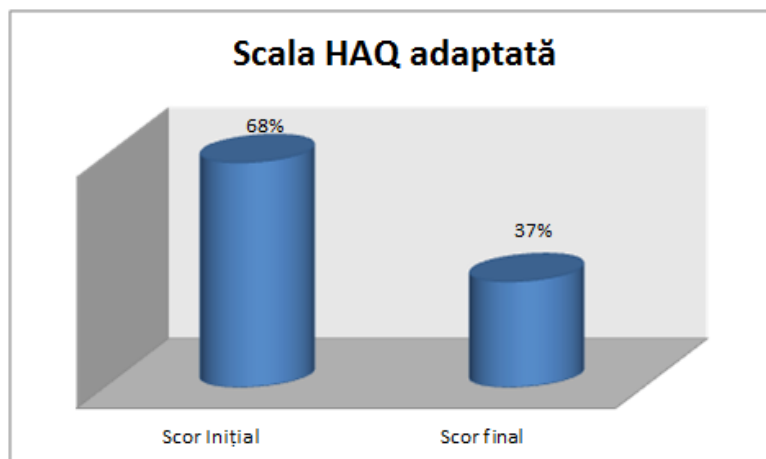
Graffic 1. Graffic interpretation of initial and final results confirmed by the DXA Examination



Graffic 2. Graffic interpretation of VAS Scale- initial and final results



Graffic 3. Assessment of life quality on osteoporosis patient – initial, intermediate, final results



Graffice 4. HAQ Scale– initial and final score, graffice interpretation

Conclusions:

The final result is a satisfactory one because the T score at lumbar level L1 – L4 decreased by -0.2 and at the hip decreased by -0.4 in 6 months, which means a lot.

The main research objective was to halt the development of osteoporosis and the decrease in the degree of osteoporosis with -0, 2 lumbar respectively -0, 4 at hip came like a bonus to our efforts.

The kinetic treatment played an important role in decreasing the fracture risk and the prophylactic one helped in eliminating stress and sedentary. Both the assumptions made and the objectives set in this research were confirmed due to the effectiveness of the rehabilitation program. The kinetotherapeutic and hydrokinetotherapeutic treatment applied to the osteoporosis patient conducted to the stagnation and decrease of disease progression.

After final evaluations, the subject has improved the quality of life through a healthy lifestyle and socio-professional reintegration into community life was a success.

References:

- [1] Georgescu Carmen, *Osteoporoza* fiziologie, diagnostic, tratament; Editura Risoprint Cluj-Napoca, 2005;
- [2] <http://www.csid.ro/health/sanatate/osteoporoza-boala-oaselor-fragile-poate-fi-prevenita-14105830>;

- [3] Păun, R., Tratat de medicină internă, Reumatologie Vol. II; Editura Medicală București, 1999;
- [4] Ionescu A., Gimnastica medicală, Editura ALL București, 1994.