

# Comparative Study of the State of Bone Tissue during Hormone Replacement Therapy and Transplantation of Human Fetal Tissues in Oophorectomized Women

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The state of bone tissue is studied in 95 women with postmenopausal syndrome. It is shown that fetal tissue therapy delayed the progression of the pathological process in bones and even increased bone density.

**Key Words:** *postmenopausal syndrome; bone density; fetal tissue transplantation; hormone replacement therapy*

Surgical interruption of ovarian function in a woman of reproductive age is accompanied by the development of postmenopausal syndrome (POS). POS consists of neurovegetative, psychoemotional, and metabolic and endocrine disturbances. The first two symptoms undergo spontaneous regression postsurgery, while the latter two invariably progress [1,4,5].

An important role in the manifestation of the metabolic and endocrine symptom complex is played by disturbed phosphorus and calcium metabolism responsible for decreased density of the bone tissue and, consequently, for an increased incidence of fractures. This has an economic impact, due not only to temporary disability, but also to primary invalidity [2,6]. In view of the above, study of pathogenesis and improved diagnosis and treatment of impaired bone density (BD) are of crucial medical and social importance.

At present, female sex steroids are commonly used for therapy and prophylaxis of postmenopausal osteoporosis. Natural estrogens are used most the world over [3,7,8]. However, in Russia POS in women with terminated ovarian function is usually

treated with synthetic estrogens, whose antiresorptive effect remains virtually unstudied. Moreover, a number of contraindications and adverse effects of sex steroids underline the importance of seeking alternative ways of combating osteoporosis. One of the nonhormonal methods for correcting this disorder is transplantation of human fetal tissues (THFT), a method for POS therapy little-known in the medical world. In this connection, a comparative study of the antiresorptive effect of hormonal preparations containing natural estrogens and gestagens and THFT in therapy of postmenopausal osteoporosis is of both theoretical and practical importance.

## MATERIALS AND METHODS

The state of bone tissue was evaluated by single photon absorptiometry performed at 1/3 of the distal part of the radius using a Norland single photon absorptiometer and proton 125 as the radiation source. Absorption was calculated by a computer from the difference between the levels of radiation emitted by the source and, upon transmission through the tissues, measured by a scintillation detector. The results characterized the content of mineral components in the bone tissues (g/cm) and the bone density (g/cm<sup>2</sup>).

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TABLE 1. State of Bone Density in Different Types of Therapy

Bone density, mg/cm <sup>2</sup>	Without treatment	Divina	THFT
Before treatment	643.4±5.2	635.2±5.1	641.3±5.1
After treatment	622.5±5.9	649.6±4.1*	642.7±4.7
% of age norm:			
Before treatment	90.4±0.6	90.1±0.6	90.3±0.5
After treatment	87.2±0.6	92.0±0.4*	90.4±0.6

Note. An asterisk indicates a reliable difference between the initial and final indexes ( $p < 0.05$ ).

Both the absolute values of BD and relative indexes (percentage of the age norm) were used.

Altogether 95 women of reproductive age after bilateral oophorectomy were examined. The patients were divided in accordance with the mode of treatment: group 1 comprised 23 women receiving divina, group 2 consisted of 53 women after THFT, and the control group consisted of 19 women not receiving replacement therapy. The mean age of the patients was  $33.3 \pm 2.1$  years. The mean postoperative period was 2-3 (2.4) years.

All women included in the trial had undergone surgery for benign tumors and tumorlike neoplasms of the ovaries and benign neoplasms of the uterus. The main indications for surgery were combinations of ovarian cyst, cystoma, and adnexitis with uterine myoma, and uterine and ovarian endometriosis.

The patients were examined before and 12 months after treatment.

## RESULTS

The results of the trial are presented in Table 1. The initial values of BD of the radius (both absolute and percentage of the age norm) are seen to be considerably decreased in all groups and comparable among each other ( $p > 0.05$ ).

After 12 months of therapy these parameters in the experimental groups differed reliably from those in the control group ( $p < 0.05$ ). After 12 months in the absence of BD-correcting therapy BD had reliably decreased in comparison with the initial value ( $p < 0.05$ ). Comparison of the effects of different drugs showed the most pronounced effect to be achieved with divina. It not only halted bone loss, but also produced a reliable increase of BD ( $p < 0.05$ ) which indicates the regression of osteoporosis.

Divina produced a marked increase in both the absolute ( $15.41 \pm 4.73$  mg/cm<sup>2</sup>) and relative ( $2.1 \pm 0.5$ ) values of BD. The differences between these parameters and the absolute and relative values of BD in the control group were also reliable.

The positive dynamics of BD after THFT suggested the capacity of fetal tissues to inhibit bone loss, i.e., their antiresorptive activity.

In contrast to divina, THFT produced just an unreliable ( $p > 0.05$ ) increase in the absolute and relative values of BD in comparison with the baseline, by  $1.4 \pm 0.5$  mg/cm<sup>2</sup> and  $0.1 \pm 0.5\%$ , respectively. However, when the mean annual dynamics of BD in the THFT-treated and control groups were compared, no high rates of bone loss were noted against the background of THFT therapy. For instance, the mean annual decrease of BD (in % of the age norm) in the control group was  $3.5 \pm 0.5\%$ , while THFT slightly increased this parameter by  $0.1 \pm 0.5\%$ . The differences were reliable ( $p < 0.05$ ).

Thus, comparing the antiresorptive activity of the test preparations and THFT, we conclude that they not only possess a stimulating effect on bone density, but are even able to increase BD and actively interfere with the pathological process in the bones. The results confirm the possibility of using both methods and highlight the prospects of the new approach in the treatment of postophorectomy osteoporosis.

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