COMPARATIVE ASSESSMENT OF BONE–MINERAL AND HORMONAL STATUS IN POSTMENOPAUSAL WOMEN DEPENDING ON THE DYNAMICS OF DENTAL IMPLANT STABILITY

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Relevance. Postmenopausal alterations in the hormonal background of women lead to a decrease in bone tissue density, impaired bone remodeling, and reduced osteogenic activity, which create unfavorable conditions for dental implantation. This necessitates the development of individualized strategies for predicting and optimizing implant treatment outcomes. A comprehensive approach that incorporates clinical, hormonal, and morphofunctional parameters can significantly improve treatment effectiveness in this patient population.

Aim. To develop a system for predicting and optimizing dental implantation outcomes in postmenopausal women by assessing bone tissue condition, hormonal status, and by individually selecting the implantological treatment protocol.

Materials and Methods. The study included 114 postmenopausal women who were indicated for and underwent dental implantation. All participants underwent examinations aimed at identifying changes in bone–

mineral metabolism, assessing hormonal status, and evaluating the structural characteristics of the alveolar bone.

During follow-up, a cohort of women was identified who demonstrated non-positive (0 or negative) MEGA-ISQ score dynamics by the 3rd month of observation (n = 33; 28.95%). Among them, 4 women (3.51%) maintained negative implant stability dynamics by the end of the first year. Comparative analysis showed that non-positive MEGA-ISQ dynamics were significantly more common among women who did not receive hormone replacement therapy (HRT) (21.21% vs. 65.43%; $\chi^2 = 18.39$, $p < 0.001$). Age and implant localization did not differ between groups.

Regarding bone–mineral metabolism indicators, women with non-positive implant stability dynamics had significantly lower serum calcium and magnesium levels ($p < 0.01$ and $p < 0.001$, respectively). Phosphorus, parathyroid hormone, osteocalcin, and vitamin D3 levels did not differ between groups.

Results. Hormonal status assessment showed no difference in estrogen levels between the groups; however, women with non-positive MEGA-ISQ dynamics had significantly lower progesterone levels and significantly higher FSH levels ($p < 0.05$ and $p < 0.01$, respectively).

A paradoxical finding was revealed during the comparative analysis: immediately after dental implantation, the MEGA-ISQ score was higher in the group that later demonstrated non-positive stability dynamics ($p < 0.001$). Subsequent follow-up showed that differences in MEGA-ISQ dynamics contributed to higher final implant stability scores in the positive-dynamics group. A plausible explanation may be differences in implantation technique, as described in the “Materials and Methods” section. This assumption suggests reconsidering the algorithm for selecting implantation techniques in favor of more reliable options.

Conclusions. The study demonstrated that women with non-positive implant stability dynamics exhibited certain deviations in mineral but not hormonal parameters of bone–mineral metabolism, as well as more pronounced menopausal hormonal changes.